2018 FURBEARER PROGRAM ANNUAL REPORT

MISSOURI DEPARTMENT OF CONSERVATION

RESOURCE SCIENCE DIVISION

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TABLE OF CONTENTS

ANNUAL HIGHLIGHTS

- MDC records black bear sightings and received more than 3,000 sighting reports since 1992 with the 3,000th report recorded in November 2017.

- Gray wolf killed by a vehicle collision on Interstate 70 in Montgomery County on January 20, 2018. This is the sixth recorded confirmation of a gray wolf in Missouri.

- An April 2018 mountain lion confirmation resulted in the first time MDC has detected a single individual mountain lion twice by "genetically recapturing" it.

- The 2017-2018 otter and bobcat fur harvest season resulted in significantly higher harvest than the previous two seasons based on pelt registration.

- The Furbearer Program removed the previous black bear tracking website depicting home ranges of individual research bears in an effort to safeguard against illegal poaching and wildlife trafficking. In its place, a new black bear research web page and story map was launched that highlights the research efforts over the last year in a unique format designed for all ages to enjoy.

INTRODUCTION

Missouri's wild fur market has been monitored annually since 1940, with some information dating back as far as 1934. Over time, tremendous fluctuations in the harvest of Missouri's primary furbearing animals have been observed as both market and social trends changed. Missouri Department of Conservation (MDC) monitors the fur market within the state using mandatory fur dealer transaction records, mandatory pelt registration of bobcats (since 1980) and river otters (since 1996), and information gathered at fur auctions. The information in this report is based on the harvest by both trappers and hunters.

The number of Fur Dealer Permits issued by MDC peaked at 1,192 during the 1945-46 trapping and hunting season. In 2018, MDC issued **36 Resident Fur Dealer Permits**, eight less than were issued in 2017, and **6 Non-Resident Fur Dealer Permits**, the same number that were issued in 2017.

Permits to harvest furbearers by trapping methods were first required in Missouri in 1953. The number of Resident Trapping Permits issued peaked during 1980-81 at 13,248 and reached an all-time low in 2000 at 2,050 permits issued. During the 2017-18 trapping season, MDC issued **7,189 Resident** and **384 Non-Resident Trapping Permits**.

Total pelts harvested reached 834,935 in 1940-41 (over 70% were opossum and skunk pelts), and reached the second highest peak in 1979 at 634,338 when average raccoon pelt values were estimated at $27.50. The economic value of harvested fur also peaked in 1979-80 at over $9 million. Pelt values declined dramatically during the late 1980s and through the mid-1990s. As a result, the number of participants also fell to all-time lows. The global fur market for the coming season is uncertain at this time and auction houses have dealt with falling markets throughout the current season (NAFA, 2018; FHA, 2018). China and Russia are still the most promising markets for wild fur, but the current political and economic climate has created some uncertainty this year. Overproduction of ranch-raised fox and mink has had direct effects on wild fur markets, especially muskrat, raccoon, and fox (NAFA, 2018). While wild fur has followed the ranch fur market to some degree, the wild fur market decline has been less harsh and with ranch production costs exceeding profits, global ranch mink production may be reduced in the coming season and a market rebound could be on the horizon (FHA, 2018).

In addition to harvest information, wildlife populations trends are monitored using observations collected by MDC staff (Sign Station Survey) and bow hunters (Archer's Index). Sign station surveys are conducted each September by MDC staff in 25 counties. Archer's Index is based on annual wildlife observation reports submitted by cooperating bow hunters. A more detailed account of this year's Sign Station Survey and Archer's Index can be found in **Section II** of this report.

Also contained in **Section II** are updates and progress summaries for various furbearer-related research projects, monitoring efforts, and items of interest. **Section II** is for informational purposes and these should be considered preliminary reports. For more information on any of these reports please contact Laura Conlee at laura.conlee@mdc.mo.gov.

SECTION I:
Missouri Furbearer Status 2017-2018

FUR HARVEST COMPARISONS

Individuals interested in buying or selling fur in Missouri (i.e., fur dealers) must obtain a commercial permit from MDC. Permit requirements include maintaining and submitting records of all fur transactions (e.g., buying, selling, retaining inventory, etc.). Data collected from fur dealers provide MDC an estimate of furbearer harvest. Additionally, bobcat and river otter harvest numbers are gathered from mandatory pelt registration, including tagging, as required by CITES for export outside the United States.

Pelt prices have steadily declined the last four seasons, resulting in reduced harvest for most species. MDC issued a total of **7,573 trapping permits** for the 2017-18 trapping season, an increase in number issued from the previous season (Table 1). Fur buyers continue to house high inventories of all species and pelt prices continue to be low; therefore, the 2018-19 season will likely be similar to the last 2-3 years unless the global fur market changes.

Table 1. Furbearer harvest and pelt prices in Missouri over the last three harvest seasons.

Species	2017-18		2016-17		2015-16	
	Pelts sold[1] or registered*	Pelt Prices from MTA Auctions[2]	Pelts sold or registered*	Pelt Prices from MTA Auctions[2]	Pelts sold or registered*	Pelt Prices from MTA Auctions[2]
Raccoon	26,340	$4.86	32,106	$2.77	34,758	$5.84
Opossum	1,296	$1.57	1,176	$1.74	2,455	$0.64
Muskrat	6,590	$2.95	10,205	$3.60	6,057	$2.37
Coyote	5,177	$13.66	6,586	$12.52	4,419	$12.18
Beaver	2,644	$6.42	3,522	$6.90	1,933	$10.94
Mink	299	(m) $7.87 (f) $5.00	356	(m) $10.71 (f) $5.00	263	(m) $10.81 (f) $9.75
Red Fox	812	$15.24	587	$22.75	643	$16.34
Gray Fox	434	$12.80	293	$12.33	308	$15.72
Striped Skunk	197	$3.11	354	$5.50	227	-
Badger	15	$23.75	1	$18.00	14	-
Bobcat*	3,018	$29.48	2,317	$34.99	2,277	$34.74
River Otter*	2,025	$23.46	1,602	$30.79	1,368	$25.53
Trapping permits issued	7,573		7,341		7,992	

[1] Number of pelts sold is based on reports received from 37 Furbuyer Permittees.
[2] Pelt prices are averaged from all fur sold, including green, finished, and damaged furs.
* Bobcat and River Otter harvest numbers are based on CITES registration.
- No information available.

MISSOURI FUR AUCTION PRICES

The Missouri Trappers Association (MTA) hosts fur auctions each year in the state of Missouri, providing opportunity to buy or sell harvested pelts. In the 2017-18 season, MTA hosted just one auction in February. Pelt prices are averaged from all fur sold, including green, finished, and damaged furs. Overall average pelt prices decreased by nearly 5% from last year (Table 2). Striped skunk, red fox, and mink exhibited the greatest decrease in average pelt price from last year with 44%, 33%, and 24% decreases, respectively. River otter average pelt price decreased by 24% and bobcats decreased by 16% from last year. Declines in pelt prices are not a recent occurrence, but have been on a steady drop since price peaks in 2012. Most pelt prices this year were below the five-year average (Table 3).

Table 2. Furbearer pelt prices in Missouri from the annual Missouri Trappers Association Fur Auction 17 February 2018, Montgomery City, Missouri.

Species	2017-2018 Summary		Change from 2016-2017	Change from Peak in 2012-2013
	Total Sold	17-Feb		
Raccoon	1,235	$4.86	75.5%	-76.6%
Virginia Opossum	132	$1.57	-9.8%	25.6%
Muskrat	501	$2.95	-18.1%	-75.0%
Coyote	497	$13.66	9.1%	-38.6%
Beaver	212	$6.42	-7.0%	-70.4%
Mink	35	$7.21	-24.3%	-70.0%
Red Fox	90	$15.24	-33.0%	-61.1%
Gray Fox	37	$12.80	3.8%	-63.1%
Striped Skunk	9	$3.11	-43.5%	-4.3%
Badger	6	$23.75	31.9%	*6,150.0%
Bobcat	94	$29.48	-15.7%	-74.5%
River Otter	56	$23.46	-23.8%	-72.6%

* Change in Badger pelt price is artificially inflated because average pelt price in 2012-2013 was $0.38 and very few pelts were sold.

Table 3. Comparison of average Missouri Trappers Association Fur Auction prices over the last five trapping seasons with a five-year average.

Species	Average Price Per Season					5-year average
	2017-18	2016-17	2015-16	2014-15	2013-14	
Raccoon	$4.86	$2.77	$5.84	$7.75	$13.04	$6.85
Virginia Opossum	$1.57	$1.74	$0.64	$1.80	$1.63	$1.48
Muskrat	$2.95	$3.60	$2.37	$5.58	$9.94	$4.89
Coyote	$13.66	$12.52	$12.18	$18.14	$18.12	$14.92
Beaver	$6.42	$6.90	$10.94	$11.11	$14.86	$10.05
Mink	$7.21	$9.52	$10.47	$11.18	$14.81	$10.61
Red Fox	$15.24	$22.75	$16.34	$24.81	$36.24	$23.08
Gray Fox	$12.80	$12.33	$15.72	$18.47	$24.01	$16.67
Striped Skunk	$3.11	$5.50	-	$3.83	$2.50	$3.74
Badger	$23.75	$18.00	-	$32.67	$17.50	$22.98
Bobcat	$29.48	$34.99	$34.74	$60.08	$120.13	$55.88
Otter	$23.46	$30.79	$25.53	$34.97	$60.57	$35.06

- No information available

RACCOON HARVEST AND POPULATION TRENDS

Raccoon harvest in 2017-18 totaled 26,340 and included individuals harvested by both trapping and hunting methods (Figure 1). This year's harvest was down 17.96% from last year, which is a more dramatic decline than was observed the previous year. Harvest is down 24.22% from two years ago, following the trend of pelt price. The 2017-18 season resulted in the lowest raccoon harvest since 1942 and the longest duration of decline in harvest numbers over the last 25 years. Average raccoon pelt prices increased by 75.5% this year from 2016-17, but are still just a quarter of the last price peak in the 2012-13 season. The North American Fur Auctions (NAFA) reported a limited interest in raccoons at their annual auctions in 2018.

Population trends are derived from the Bowhunter Observation Survey and Furbearer Sign Station Survey. For a detailed description of these surveys, see Section II of this report. During the hunting season of 2017, bowhunters submitted the number of raccoons observed during archery hunting hours and the number of hours spent afield. Based on these observations, the number of raccoons sighted per 1,000 hours increased by 33% to 48.5 in 2017 from 36.6 in 2016 (Figure 2). Presence of raccoon tracks at furbearer sign stations also increased slightly to an index of 185 in 2017 from 183 in 2016 (Figure 3). Although raccoon abundance data is based on trend information, multiple surveys indicate an overall increasing trend in population abundance. Short-term fluctuations are normal and expected due to the dynamic nature of raccoon populations. Based on harvest and pelt prices of previous trapping and hunting seasons, harvest pressure is expected to, once again, be reduced in the 2018-19 season.

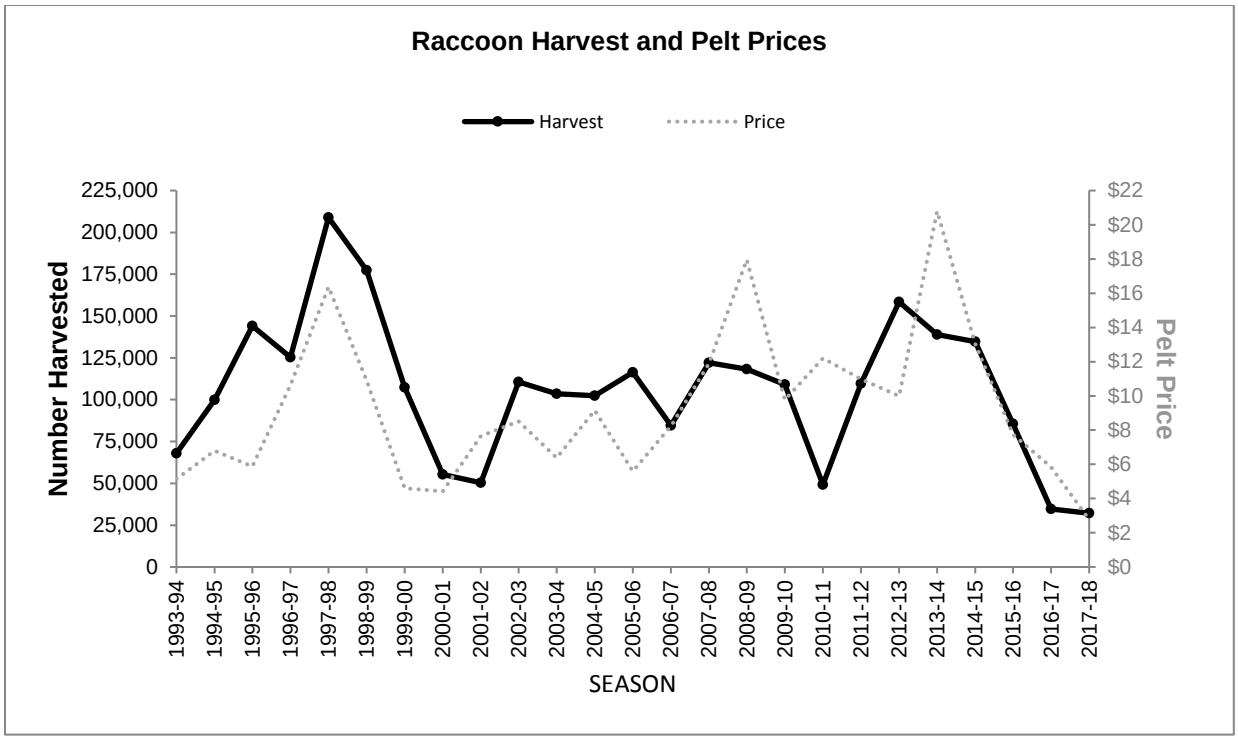

Figure 1. Comparison of Missouri raccoon harvest and pelt prices over the last 25 years. Harvest estimates are derived from fur buyer records. Annual pelt prices are the average price from the Missouri Trappers Association Fur Auction.

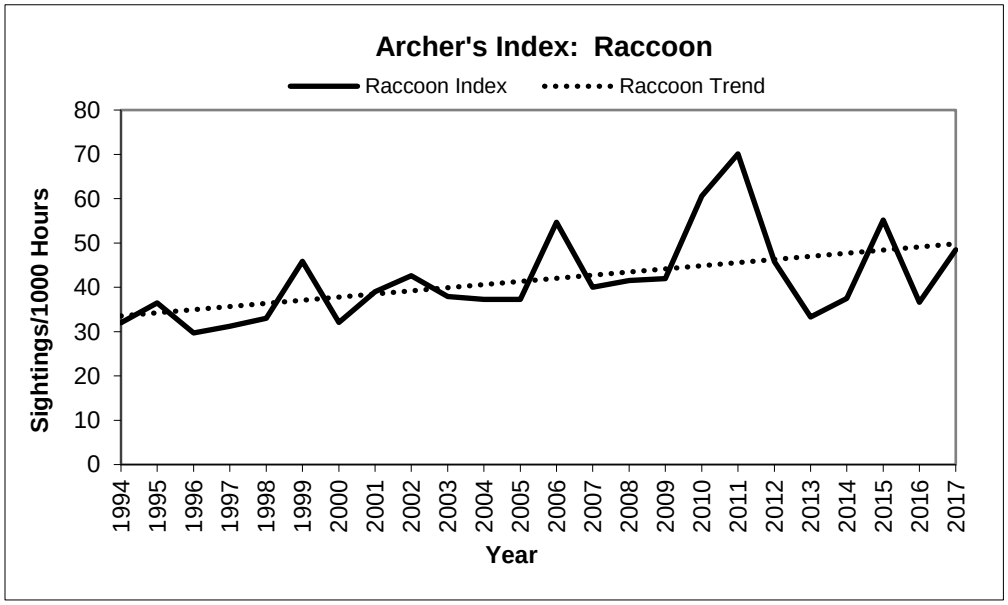

Figure 2. Raccoon population trends based on the Archer's Index, derived from the MDC Bowhunter Observation Survey.

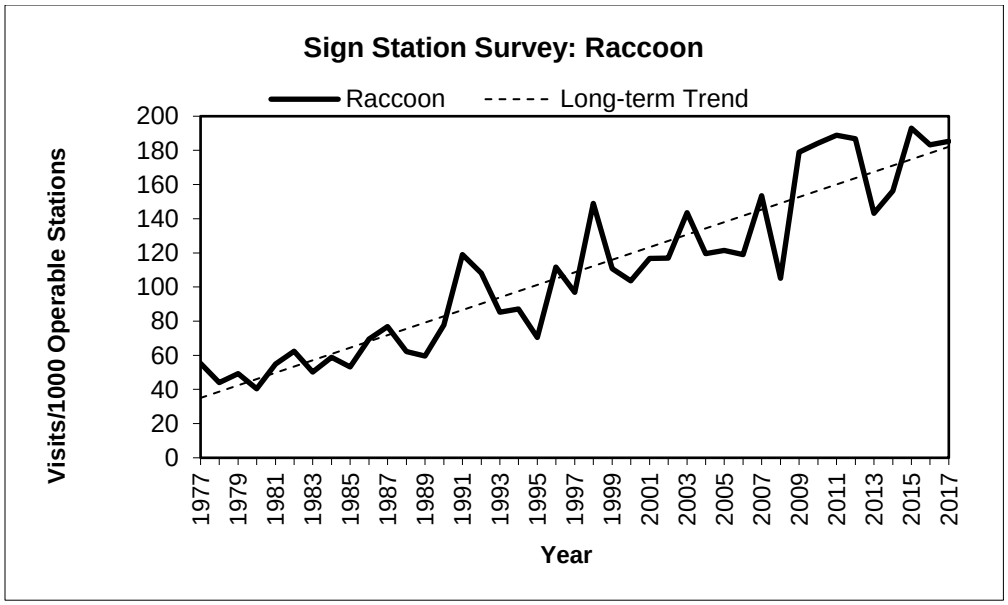

Figure 3. Missouri raccoon population trends based on Furbearer Sign Station Survey Index.

COYOTE HARVEST AND POPULATION TRENDS

Coyote harvest, based on Commercial Fur Buyer reports, during the 2017-18 furbearer season was down 21% from the 2016-17 season with 5,177 individuals harvested (Figure 4). Predator hunting continues to increase in popularity and survey data suggest over 25,000 people hunt coyotes annually. Although coyote pelt prices averaged only $13.66 this year, many trappers still enjoy the challenge of catching coyotes and this is reflected in the harvest totals. Additionally, the use of cable restraints has increased opportunity for coyote harvest, supplying both the fur and live markets. Coyote pelts also are becoming increasingly popular as trim for jackets, which may be influencing the local market for this species (NAFA, 2018).

Population trends are derived from the Bowhunter Observation Survey and Furbearer Sign Station Survey. For a detailed description of these surveys, see Section II of this report. Population trend data from the Archer's Index (Figure 5) and sign station survey (Figure 6) for coyotes suggest populations are stable. However, the coyote population appears to be on the increase since the 1970s when the Sign Station Survey began and the early 1980s when the Archer's Index began.

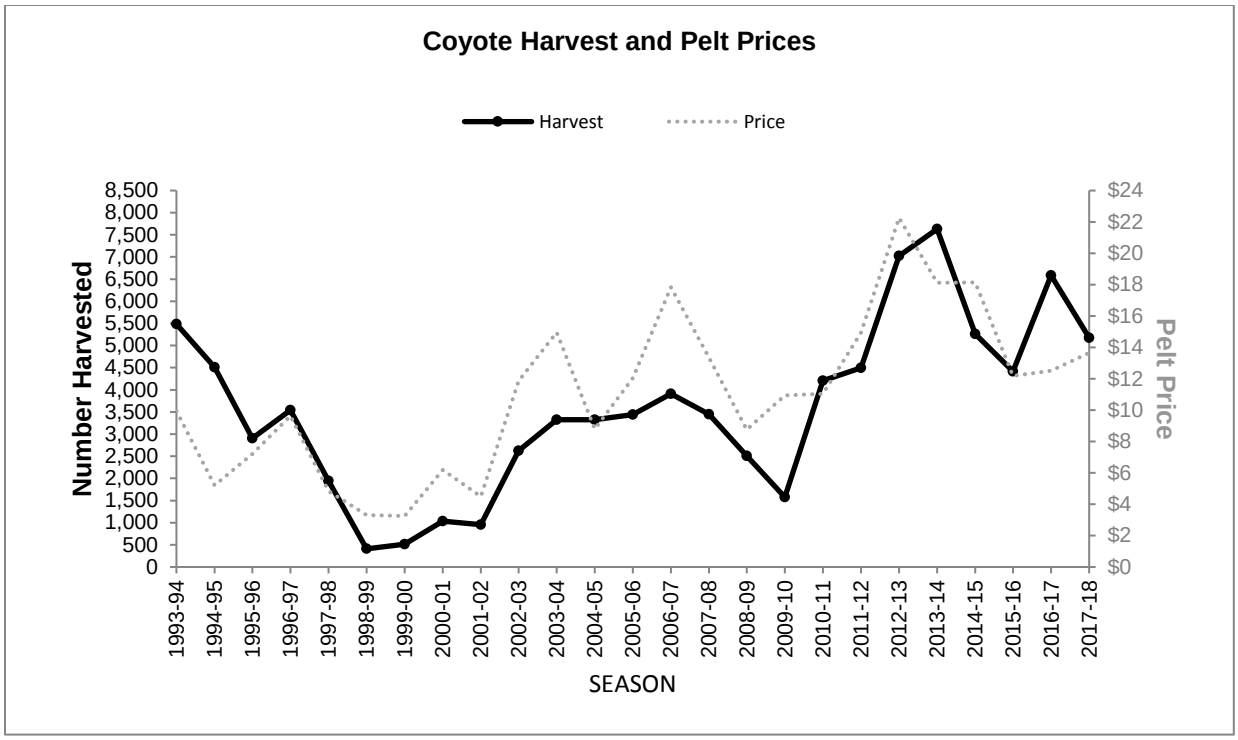

Figure 4. Comparison of Missouri coyote harvest and pelt prices over the last 25 years. Harvest estimates are derived from fur buyer records. Annual pelt price estimates are the average price from the Missouri Trappers Association Fur Auction.

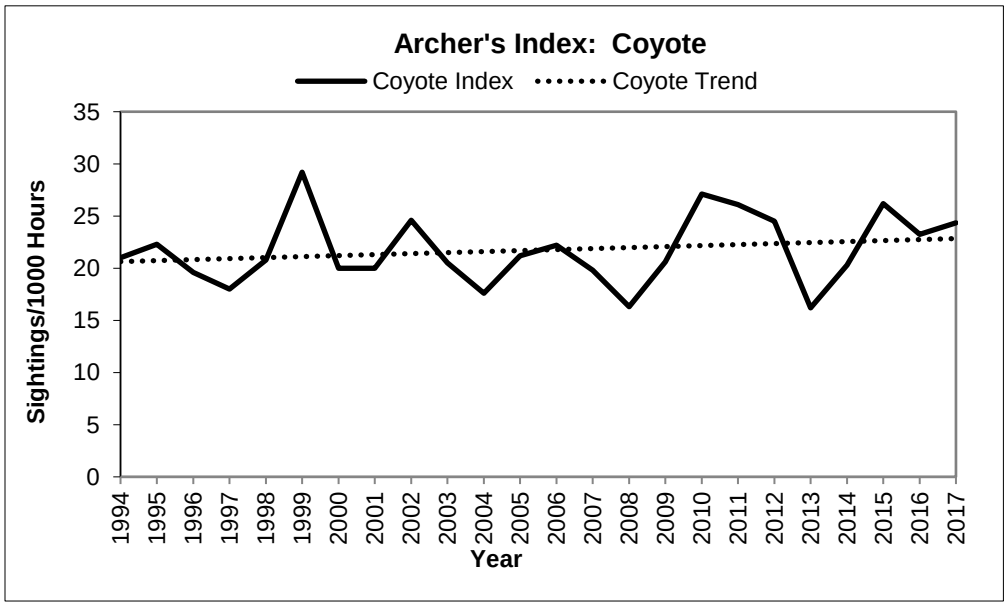

Figure 5. Coyote population trends based on the Archer's Index, derived from the MDC Bowhunter Observation Survey.

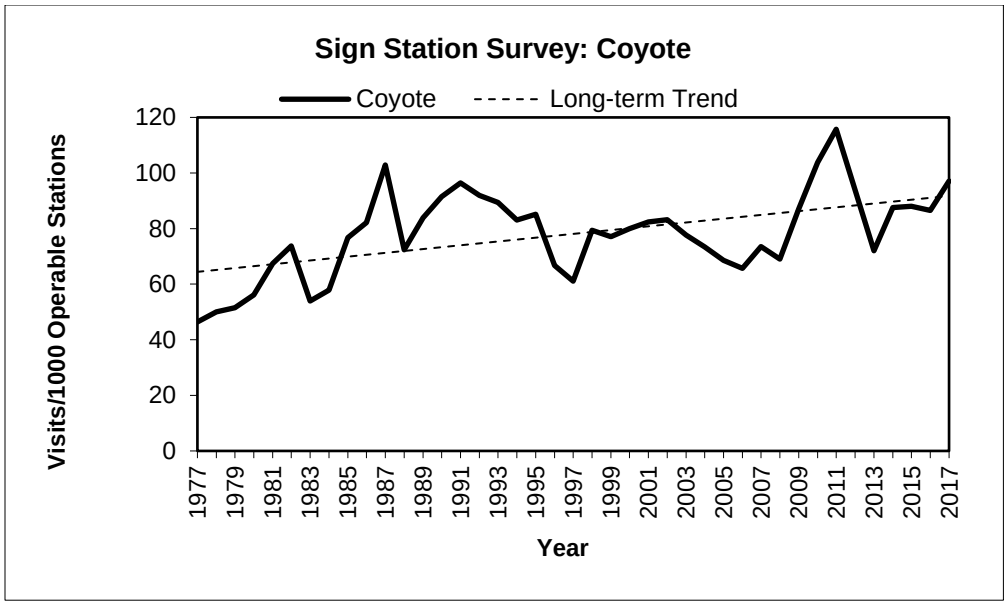

Figure 6. Missouri coyote population trends based on Furbearer Sign Station Survey Index.

FOX HARVEST AND POPULATION TRENDS

Red fox harvest during the 2017-18 season increased 38.33% from 587 to 812 individuals harvested (Figure 7). **Gray fox harvest** also increased in 2017-18 by 48.12% to 434 individuals compared with last year's harvest of 293 (Figure 8). Fox harvest is typically a by-product of bobcat or coyote trapper effort. Bobcat harvest increased in the 2017-18 season and as a result, an increase in by-catch of foxes was likely observed.

Population trends are derived from the Bowhunter Observation Survey and Furbearer Sign Station Survey. For a detailed description of these surveys, see Section II of this report. Bowhunter observations and sign station surveys offer a long-term perspective suggesting declines in both red and gray fox populations (Figures 9 and 10). Long-term fox population declines may be the result of interspecific competition with coyotes and bobcats. Another possible strain on gray fox populations is the increasing population of raccoons and the associated distemper virus, for which gray fox may be particularly vulnerable. We continue to observe slight upticks in trend indicators for both red and gray fox around suburban areas where foxes may be seeking refuge from coyotes, but the overall trend is still in decline.

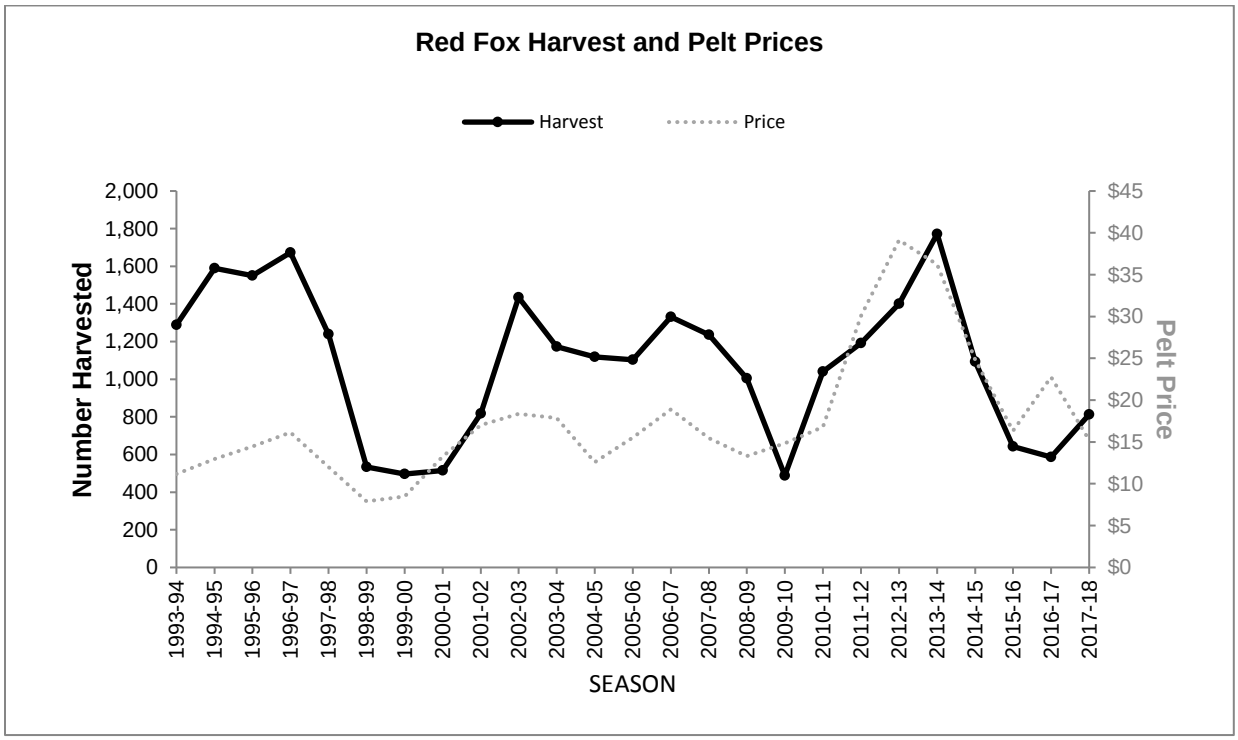

Figure 7. Comparison of Missouri red fox harvest and pelt prices over the last 25 years.

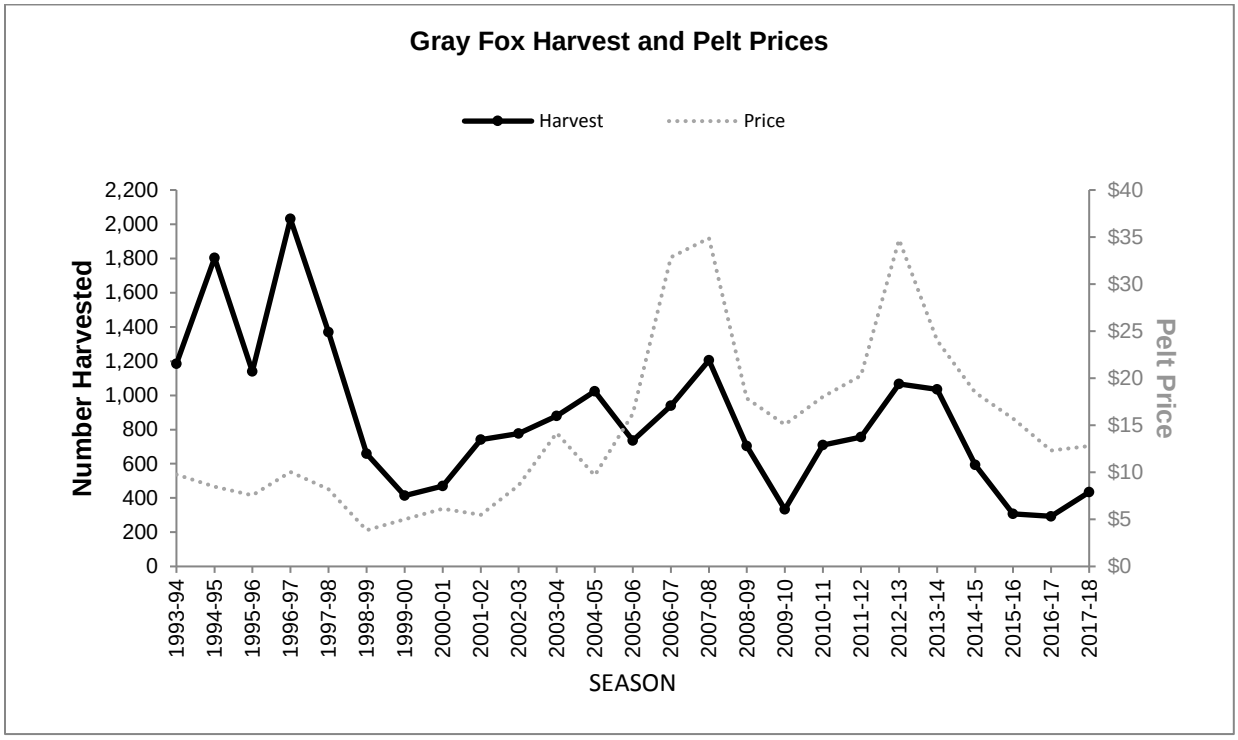

Figure 8. Comparison of Missouri gray fox harvest and pelt prices over the last 25 years.

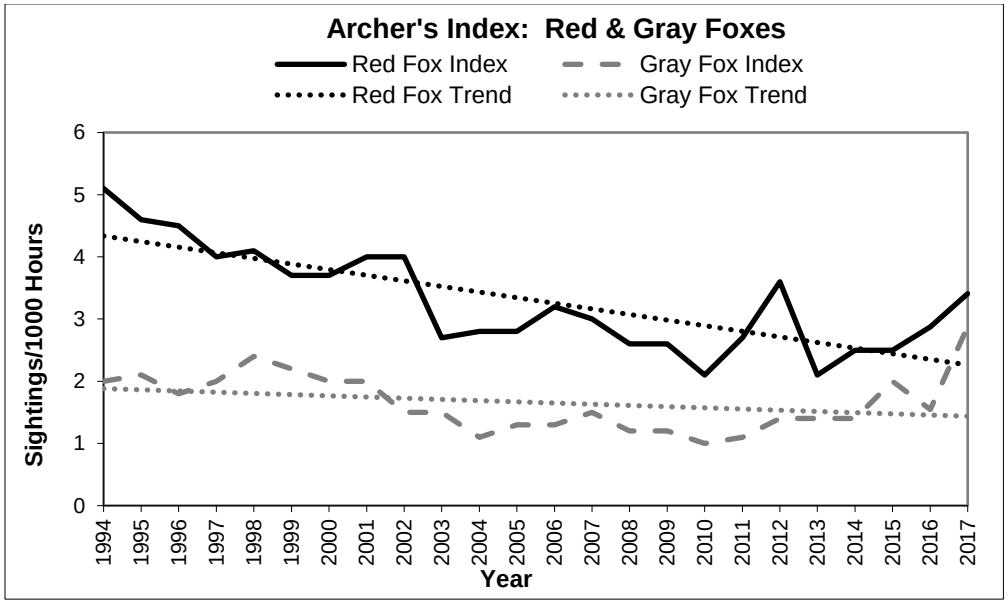

Figure 9. Missouri fox population trends based on the Archer's Index, derived from the MDC Bowhunter Observation Survey.

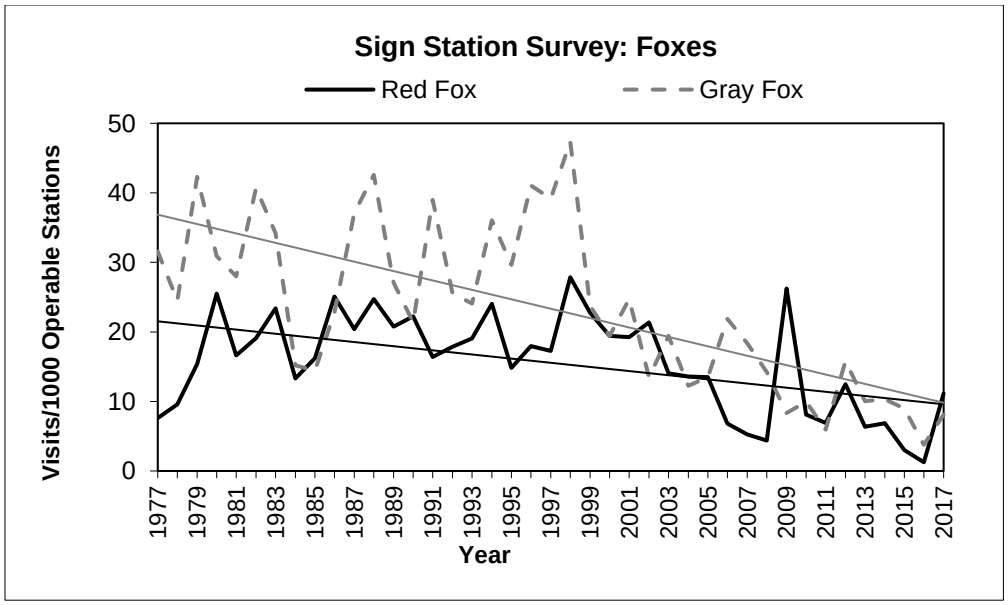

Figure 10. Missouri fox population trends based on Furbearer Sign Station Survey Index.

BOBCAT HARVEST AND POPULATION TRENDS

Bobcat harvest during the 2017-18 season was up 43.44% from 2016-17, and 36.75% above the 2015-16 season harvest (Figure 11), with **3,018 bobcats** harvested. Prices during 2017-18 decreased 15.7% from the previous year. Trappers and hunters are required to check or register bobcat carcasses or green pelts at MDC offices or with Conservation Agents. The number of bobcat pelts purchased by fur dealers (1,256) was significantly less than those registered by trappers and hunters as required by CITES (3,018). Instead of selling to fur buyers, trappers may make more money selling carcasses to taxidermists or selling mounted bobcats. The decline in harvest and in the number of bobcat pelts purchased by fur dealers is also likely attributed to a poor global fur market.

Population trends are derived from the Bowhunter Observation Survey and Furbearer Sign Station Survey. For a detailed description of these surveys, see Section II of this report. Both Sign Station Survey and Archer's Index data suggest bobcat populations may have increased slightly this year; however, the overall trend appears to be stable (Figures 12 and 13).

Geographic distribution of harvest varies by county and method. Trappers harvested 2,131 bobcats, while hunters harvested 887 bobcats. Texas County had the highest total harvest (Figure 14) and trapping harvest (Figure 15), while Barry County had the highest hunter harvest (Figure 16).

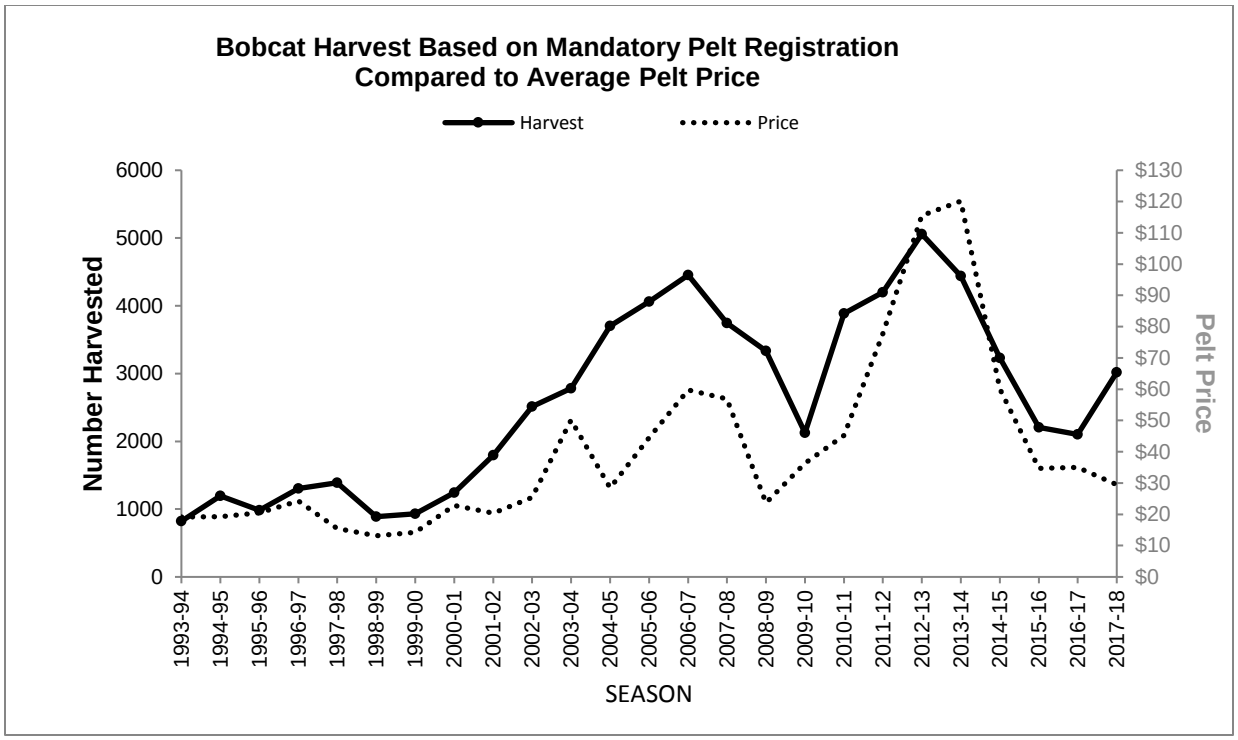

Figure 11. Missouri bobcat harvest trends over the last 25 years compared to average pelt prices.

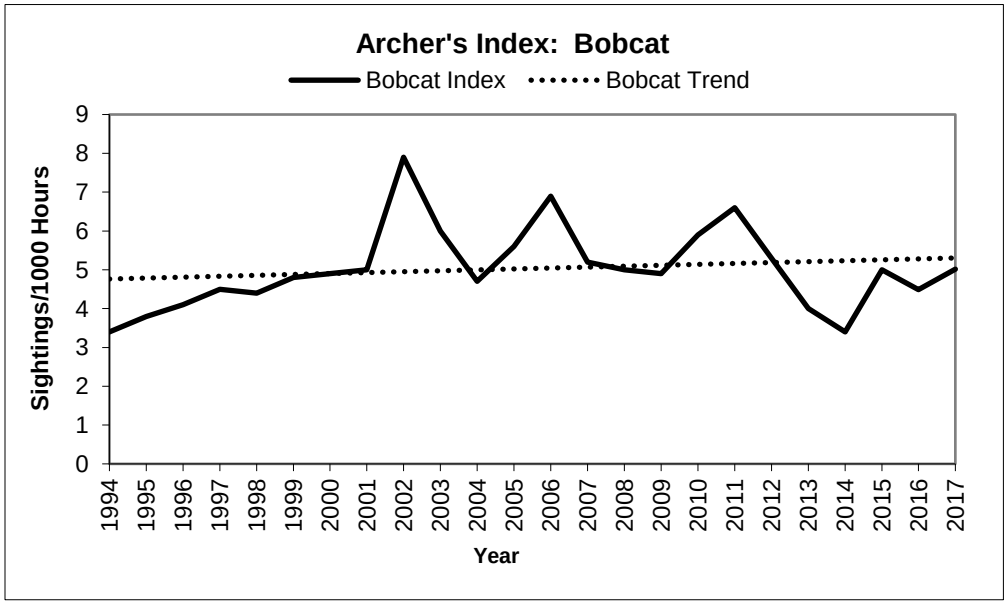

Figure 12. Missouri bobcat population trends based on the Archer's Index, derived from the MDC Bowhunter Observation Survey.

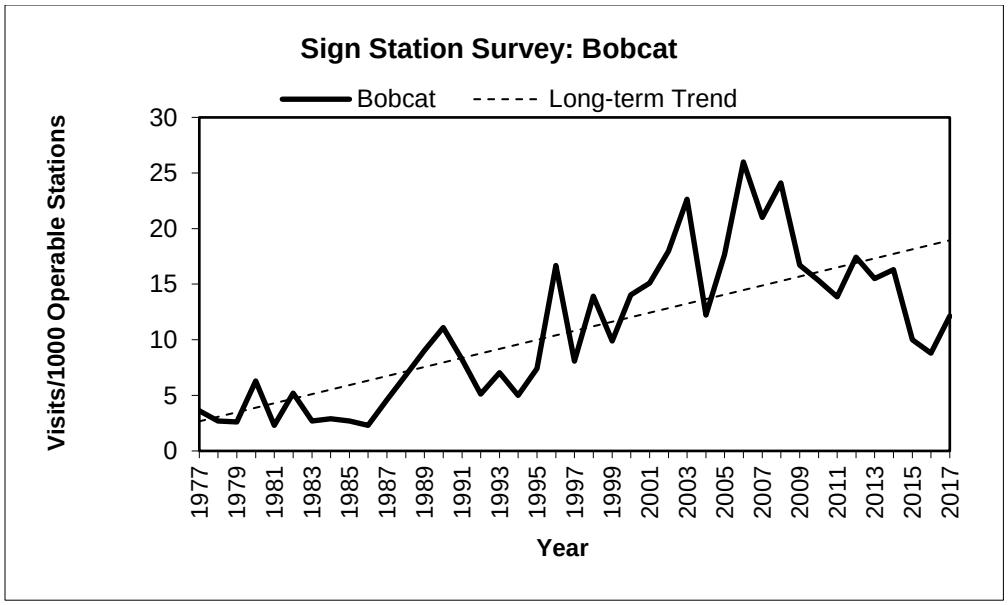

Figure 13. Missouri bobcat population trends based on Furbearer Sign Station Survey Index.

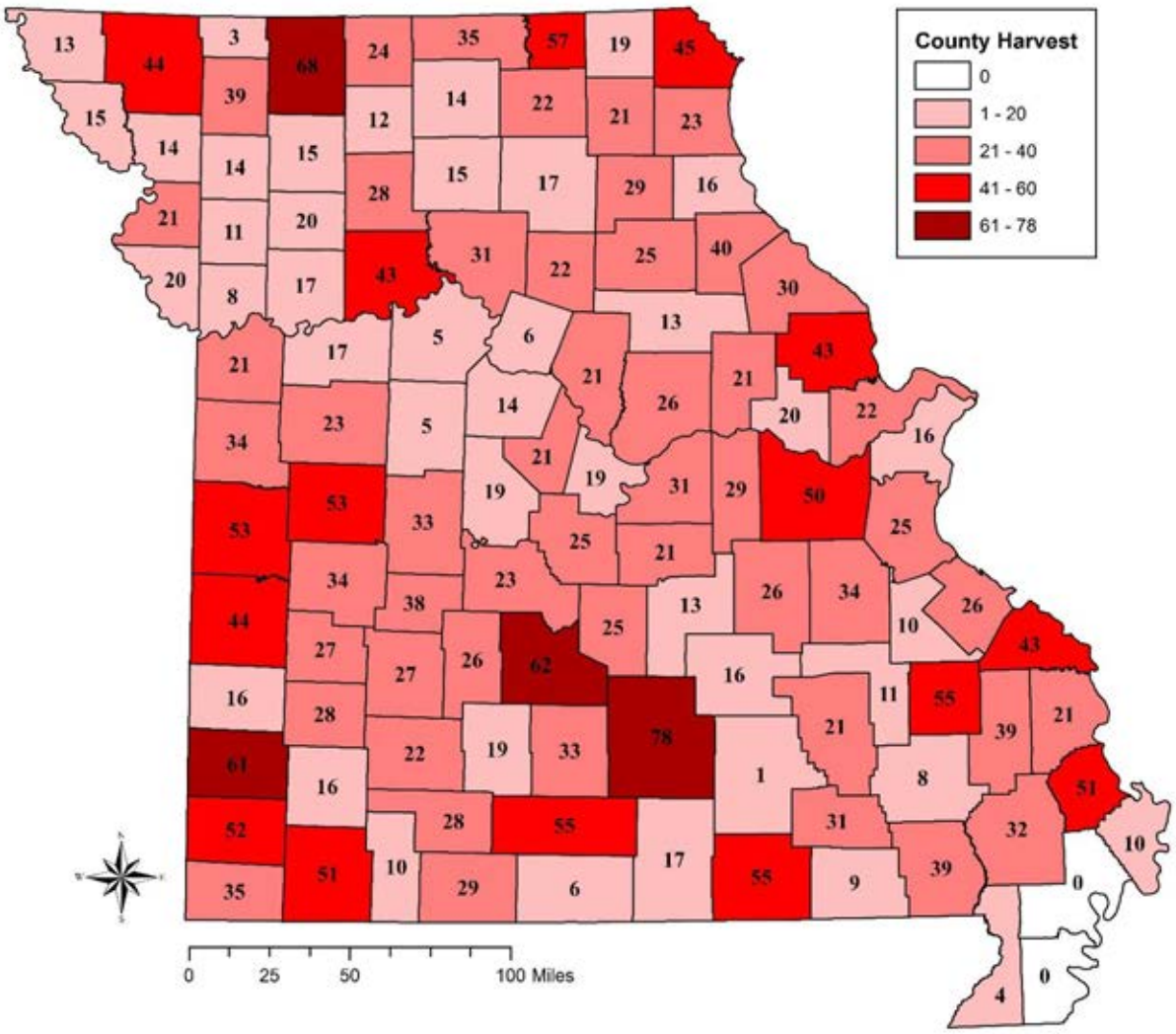

Figure 14. Number of Missouri bobcats harvested per county during the 2017-18 season.

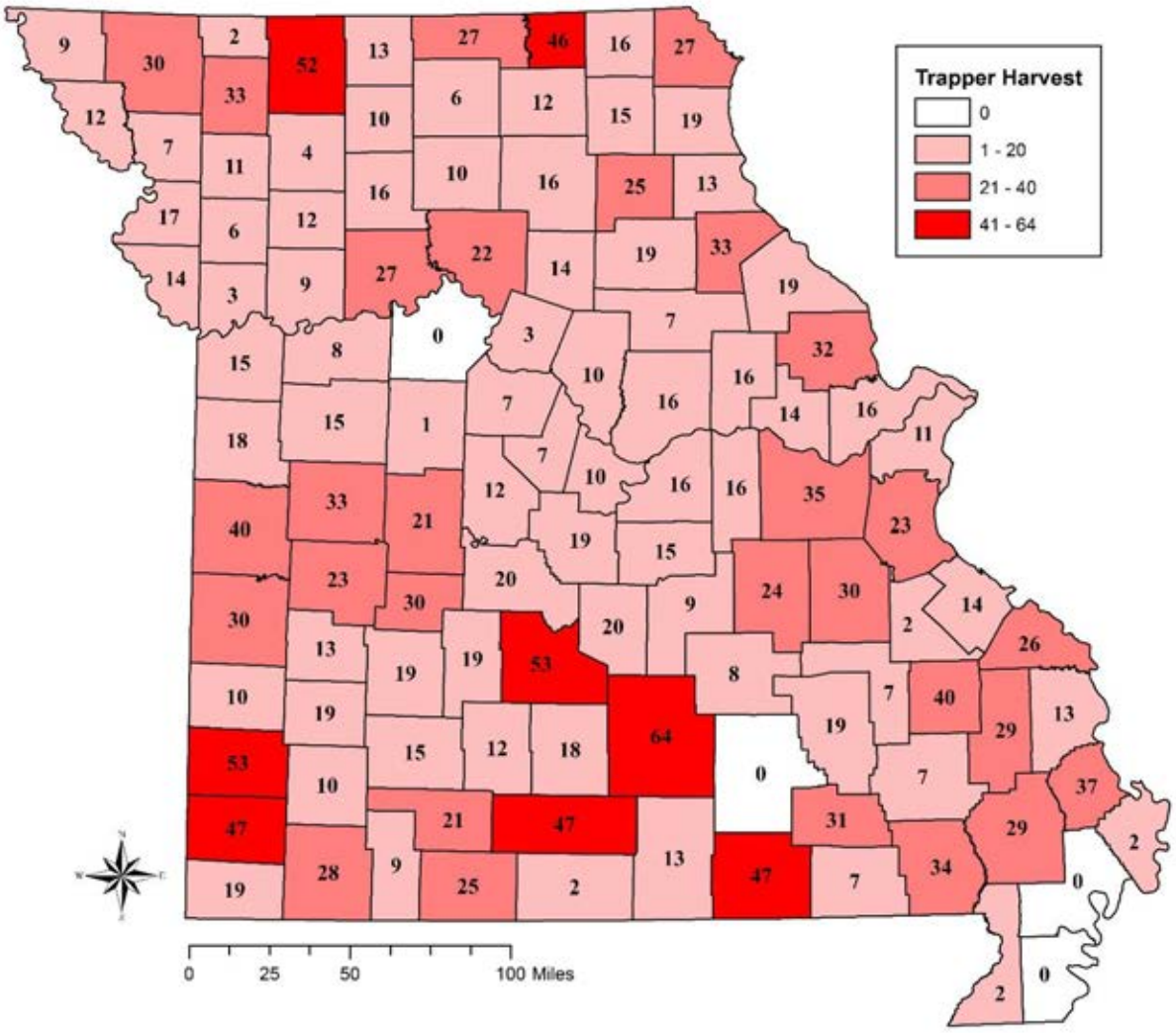

Figure 15.Number of Missouri bobcats harvested by trapping methods per county in 2017-18 season.

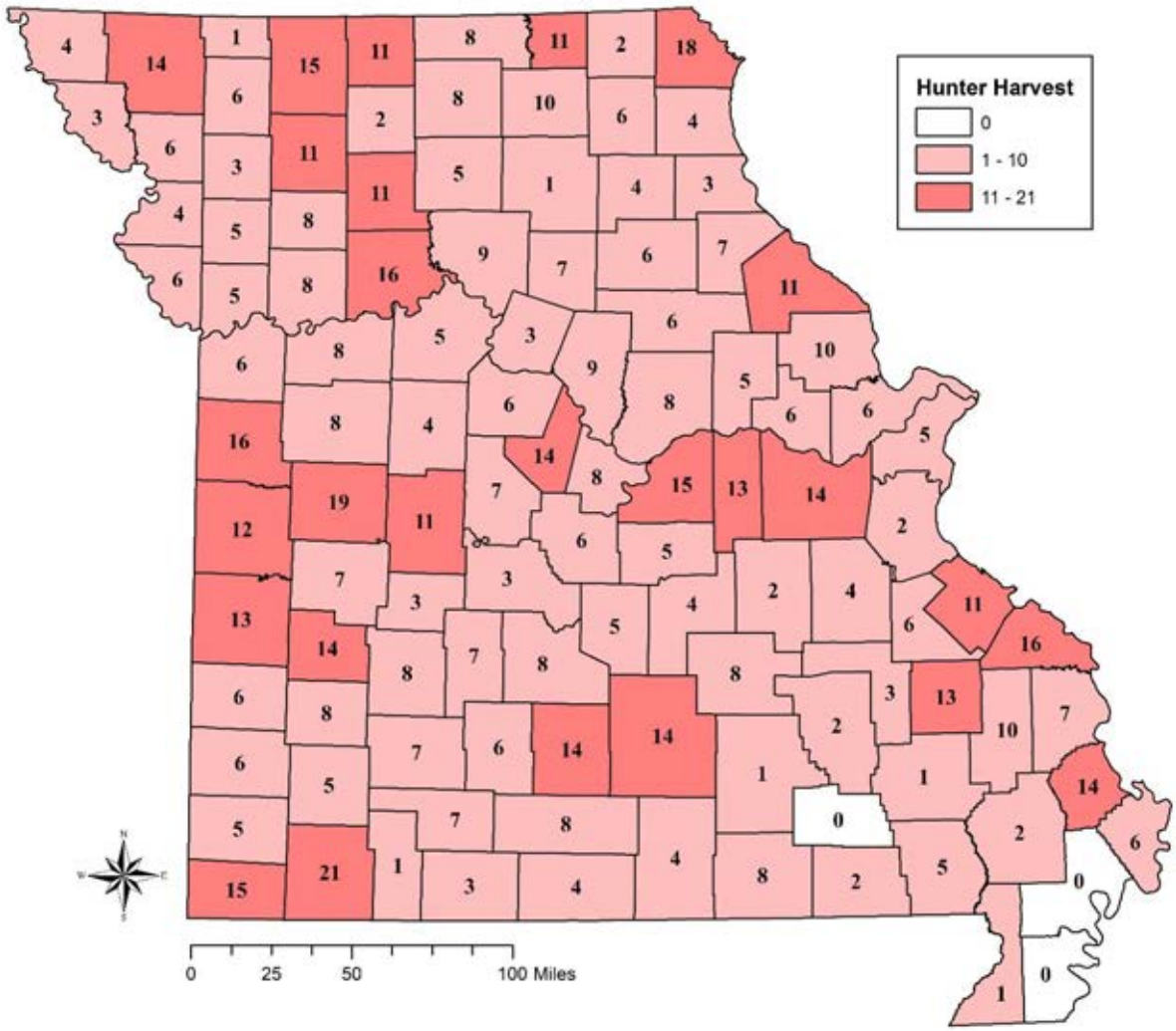

Figure 16. Number of Missouri bobcats harvested by hunting methods per county in 2017-18 season.

RIVER OTTER HARVEST

River otter harvest for the 2017-18 furbearer season was **2,025 river otters**, up 44.33% from last year, and up 49.34% from the 2015-16 season. River otter pelt prices decreased 23.8% from last year continuing the decline in pelt prices of the last 6 years. The relatively low harvest of the last 5 seasons can be attributed to the steady decline in pelt prices (Figure 17).

Trappers are required to check or register river otter carcasses or green hides at MDC offices or with Conservation Agents in accordance with requirements by CITES for exportation outside of the United States. The majority of trappers take between 1 and 5 river otters.

River otter harvest was highest in Chariton County with more than 90 individuals harvested (Figure 18). Harvest in Chariton County was also among the highest harvest counties in the last two seasons. Opportunity to harvest river otter from impoundments (i.e., ponds and lakes) and rivers or streams is abundant in Missouri, but a majority (1567) of river otters is harvested from streams (Figure 19), while about a quarter (455) of the harvest was from an impoundment in 2017-18 (Figure 20). River otter harvest during the 2017-18 season was highest in the Missouri River and Grand River watersheds (Figure 21). Approximately 18.5% of the total harvest was taken from these two watersheds (Table 4). River otters harvested from an undeclared watershed were combined into one category of "unknown" (Table 4) and comprised just under 6% of the total harvest.

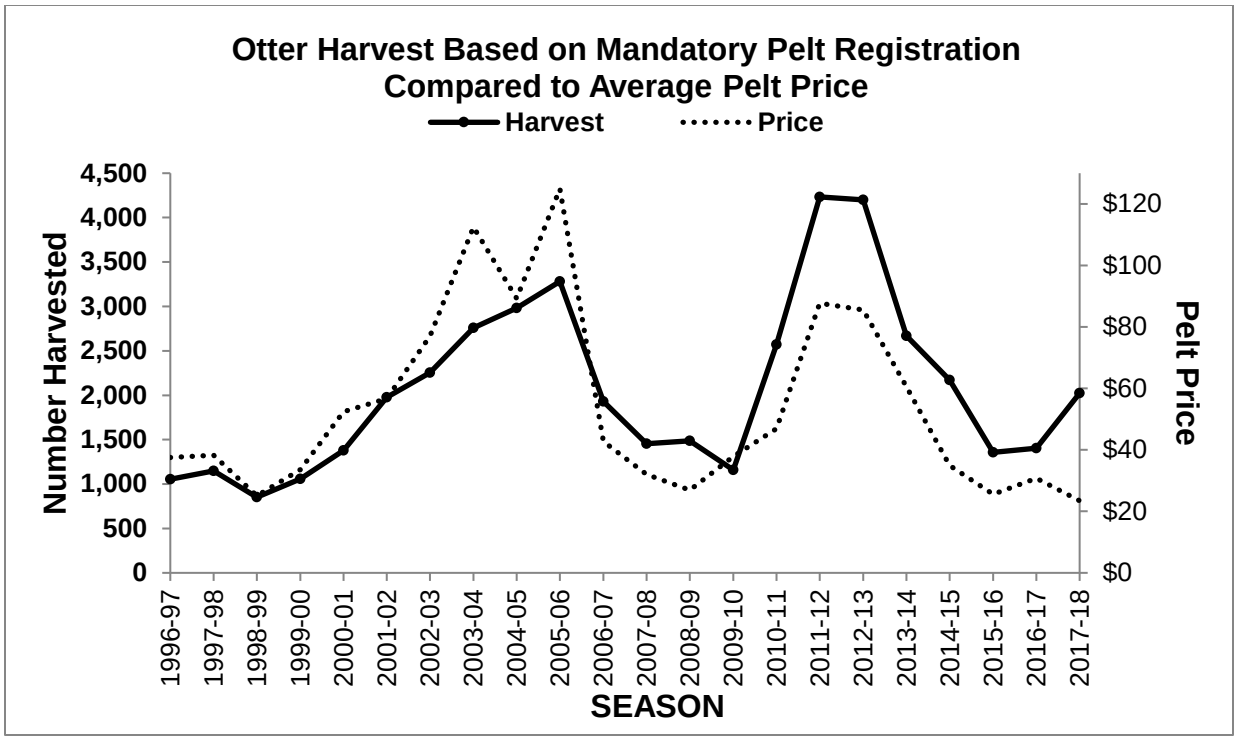

Figure 17. Missouri river otter harvest and average pelt prices from 1996 to 2017.

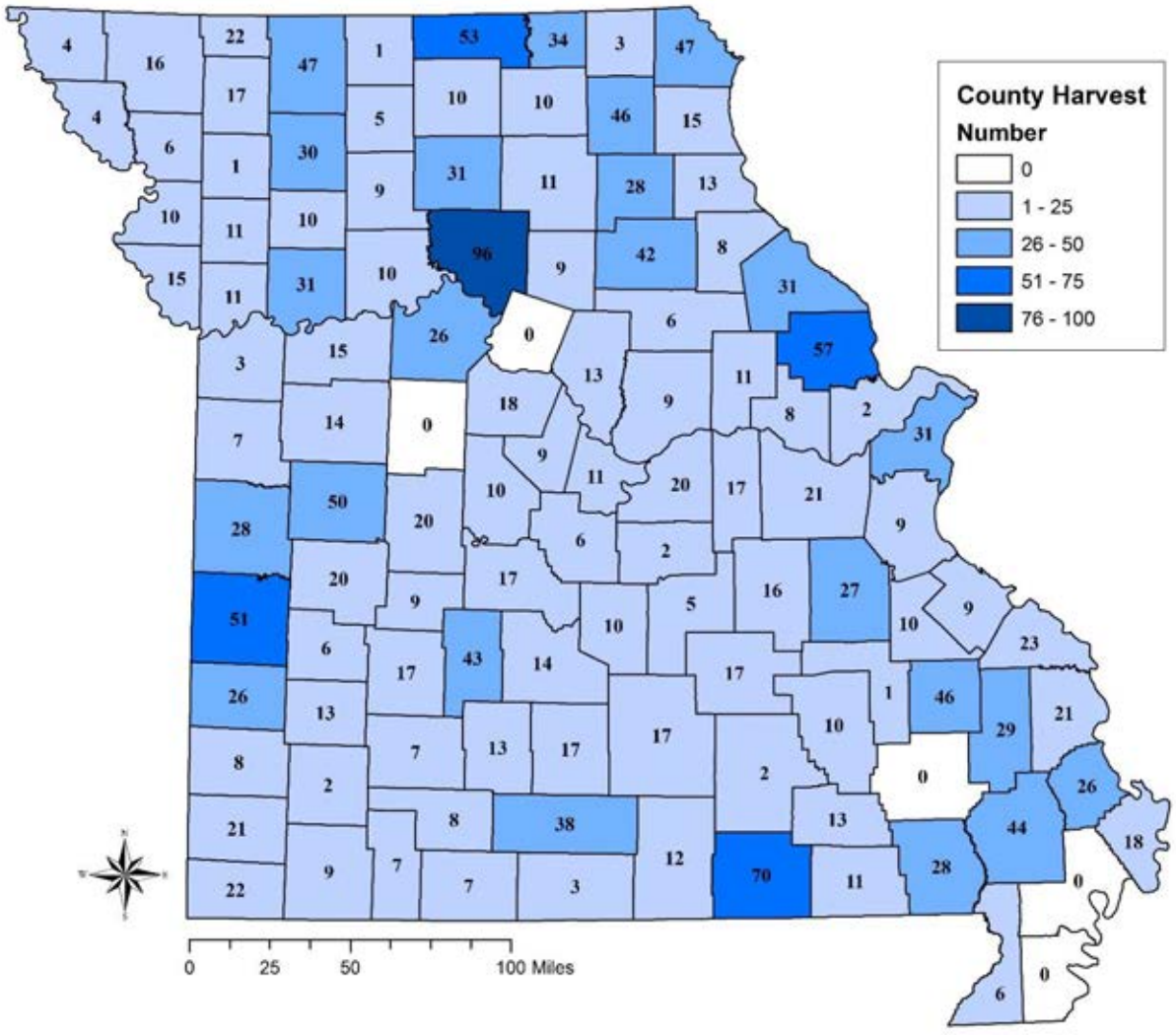

Figure 18. Number of Missouri river otters harvested in each county during the 2017-18 season.

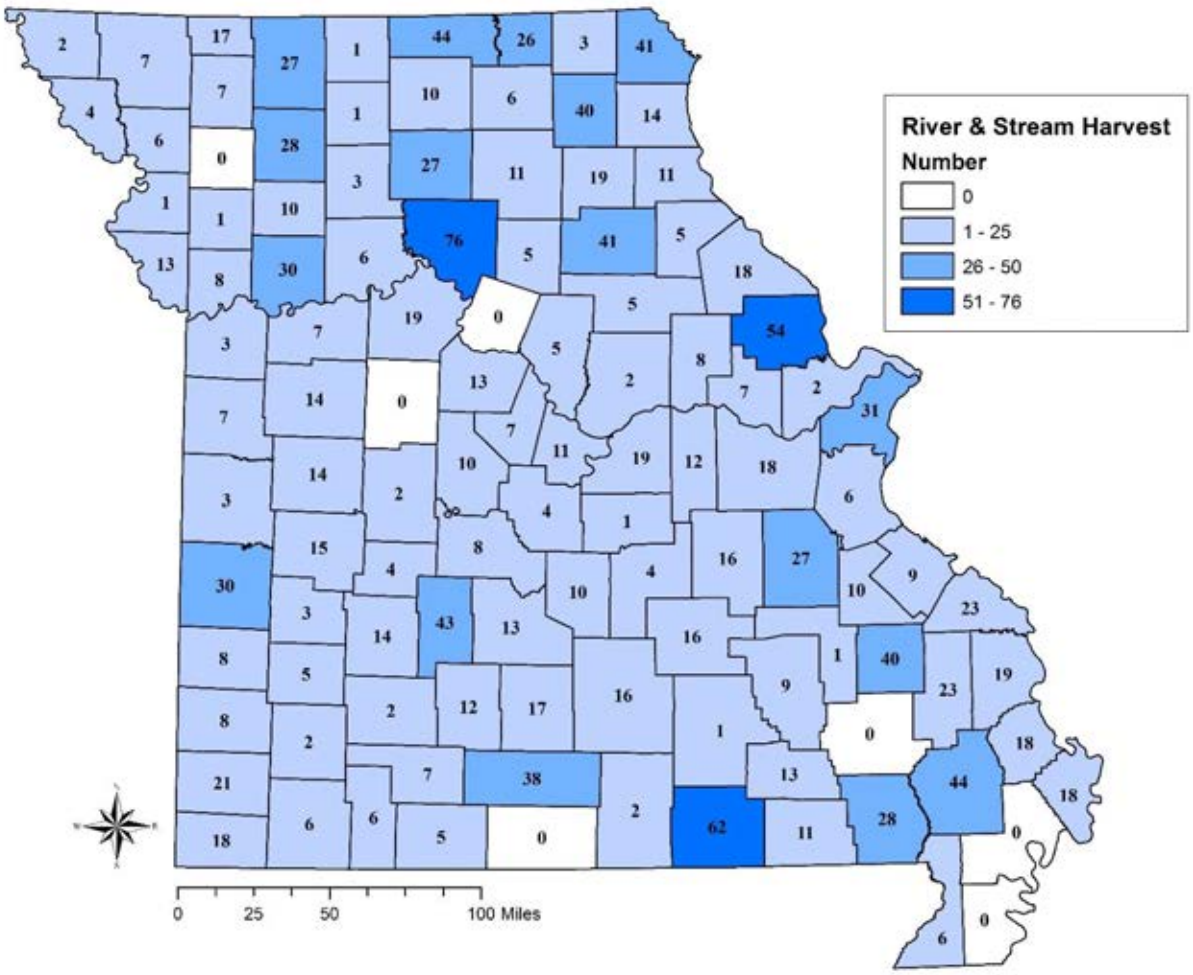

Figure 19. Number of Missouri river otters harvested from rivers or streams per county during 2017-18 season.

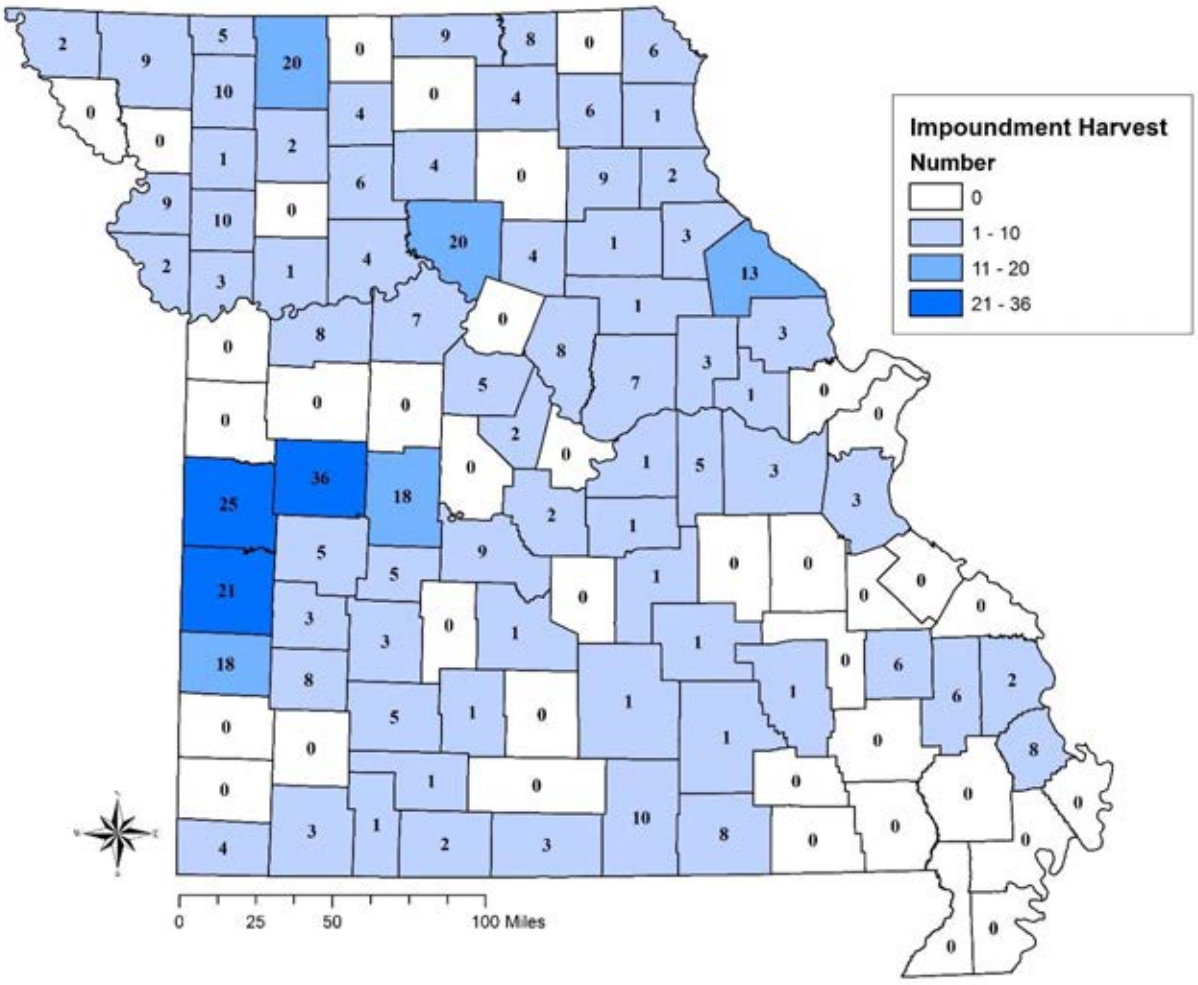

Figure 20. Number of Missouri river otters harvested from impoundments (i.e., ponds or lakes) per county during 2017-18 season.

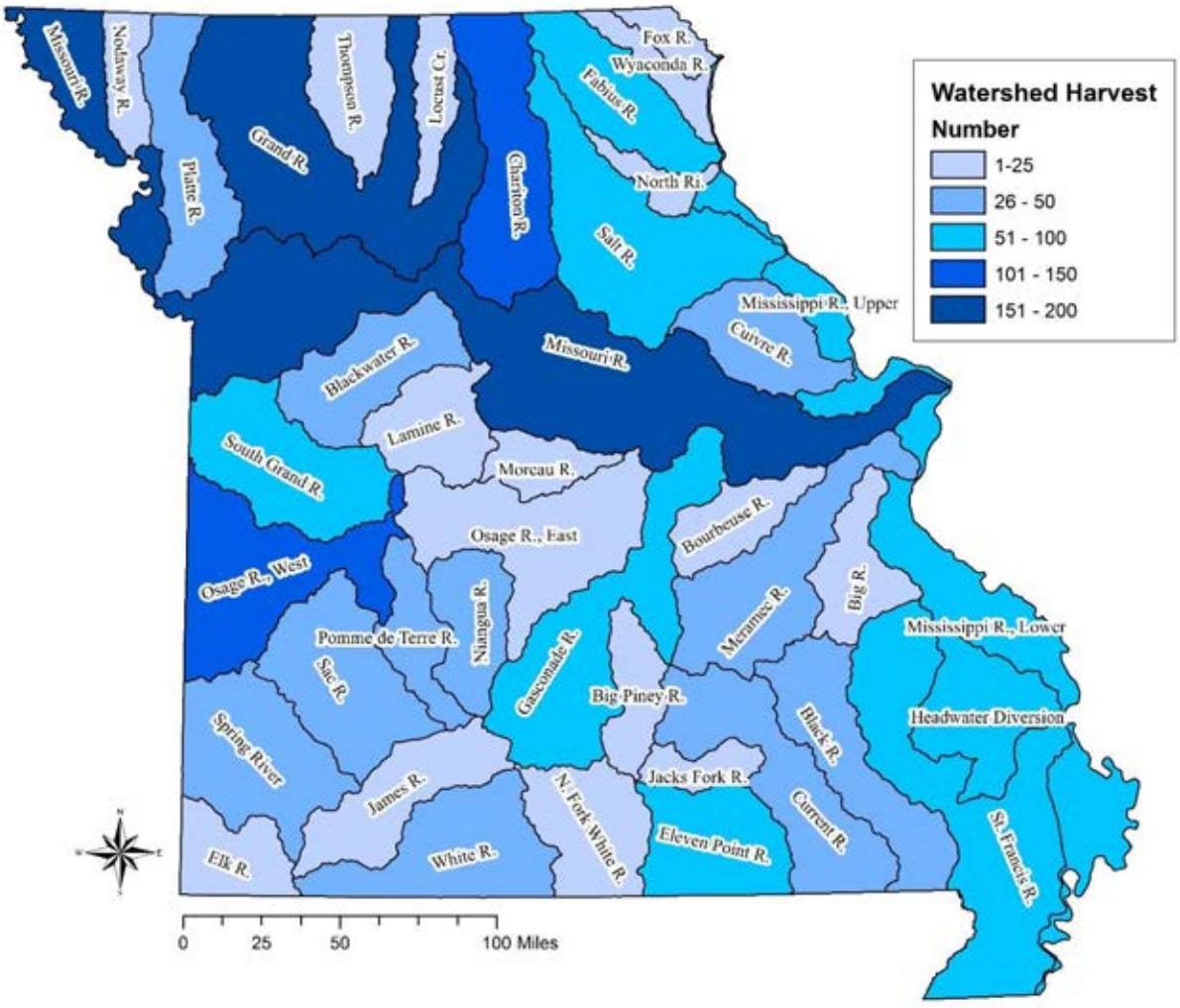

Figure 21. Missouri river otter harvest distribution among watersheds during the 2017-18 trapping season.

Table 4. Missouri river otter harvest distribution among watersheds during the 2017-18 trapping season.

Watershed	Number Harvested	Percent of Harvest
Big Piney River	14	0.74%
Big River	11	0.54%
Black River	41	2.03%
Blackwater River	39	1.93%
Bourbeuse River	13	0.64%
Chariton River	125	6.18%
Cuivre River	42	2.08%
Current River	47	2.32%
Eleven Point River	79	3.91%
Elk River	11	0.54%
Fabius River	63	3.12%
Fox River	23	1.14%
Gasconade River	59	2.92%
Grand River	194	9.59%
Headwater Diversion	52	2.57%
Jacks Fork River	14	0.69%
James River	14	0.69%
Lamine River	4	0.20%
Locust Creek	24	1.19%
Meramec River	43	2.13%
Mississippi River (lower)	71	3.51%
Mississippi River (upper)	64	3.17%
Missouri River	180	8.95%
Moreau River	10	0.49%
N. Fork White River	25	1.24%
Niangua River	44	2.18%
Nodaway River	3	0.15%
North River	14	0.69%
Osage River East	25	1.24%
Osage River West	139	6.87%
Platte River	29	1.43%
Pomme de Terre River	28	1.38%
S. Grand River	59	2.92%
Sac River	41	2.03%
Salt River	100	4.94%
Spring River	32	1.58%
St. Francis River	62	3.07%
Thompson River	14	0.69%
White River	30	1.48%
Wyaconda River	22	1.09%
Unknown	121	5.97%
Total Harvest	2,025	100%

MUSKRAT AND BEAVER HARVEST AND POPULATION TRENDS

Muskrat and beaver harvest continues to fluctuate in somewhat predictable ranges. Since 1990 muskrat harvests have varied from about 5,000 – 20,000 (Figure 22) and beaver from 2,000 – 10,000 (Figure 23). Historically, muskrat numbers have fluctuated widely; however, habitat degradation has limited populations and subsequently reduced harvest. Beavers are a longer-lived species and less vulnerable to depredation; harvest rates are more likely related to pelt values. Trappers harvested 6,590 muskrats (Figure 22) and 2,644 beavers (Figure 23) during the 2017-18 season. Muskrat prices were decreased this year, which may have been influenced by reduced interest from China and ranch mink production. Beaver is still an important item for hatters, which will help the market for this species (North American Fur Auctions, 2018).

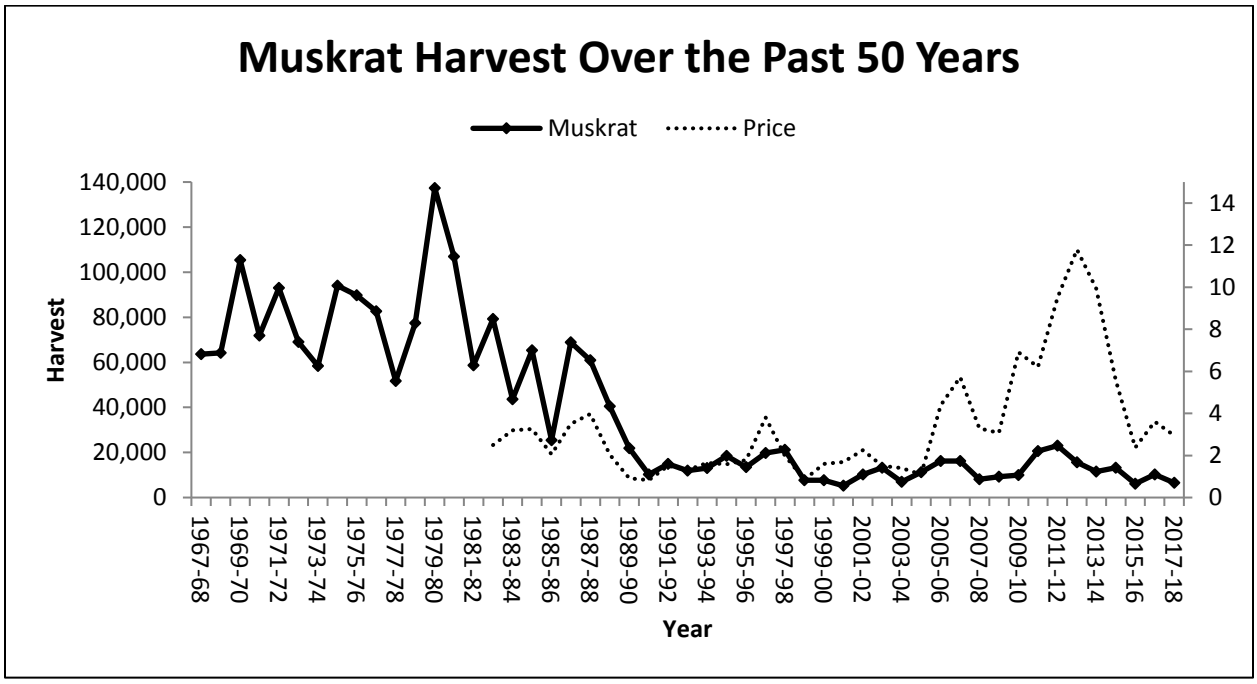

Figure 22. Comparison of Missouri muskrat harvest and pelt prices over the last 50 years. Harvest estimates are derived from fur buyer records. Annual pelt prices are the average price from the Missouri Trappers Association Fur Auction.

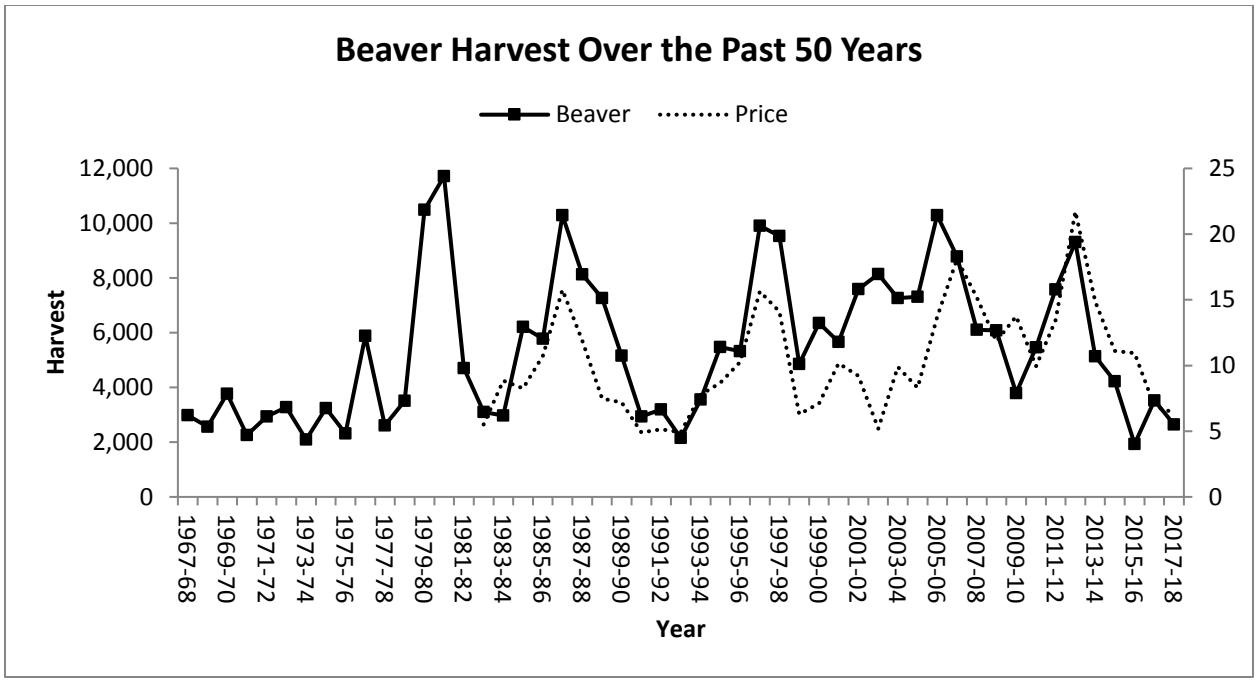

Figure 23. Comparison of Missouri beaver harvest and pelt prices over the last 50 years. Harvest estimates are derived from fur buyer records. Annual pelt prices are the average price from the Missouri Trappers Association Fur Auction.

AMERICAN BADGER STATUS IN MISSOURI

The American badger is a native, but uncommon, furbearing species in Missouri and is state-ranked as a **Vulnerable Species of Conservation Concern** by MDC. American badgers are a fossorial (burrowing animal) species and require habitat where suitable soil is available for digging burrows for both themselves and for hunting prey. American badgers can be found throughout the state in any of the **8 zoological regions** (Figure 24), but soil most suitable for burrowing mammals occurs primarily in four regions: Western Prairie, Northwest Prairie, Northern Riverbreaks, and Northeast Riverbreaks. Consequently, the bulk of the recorded sightings in the Missouri Natural Heritage database occur in these four regions.

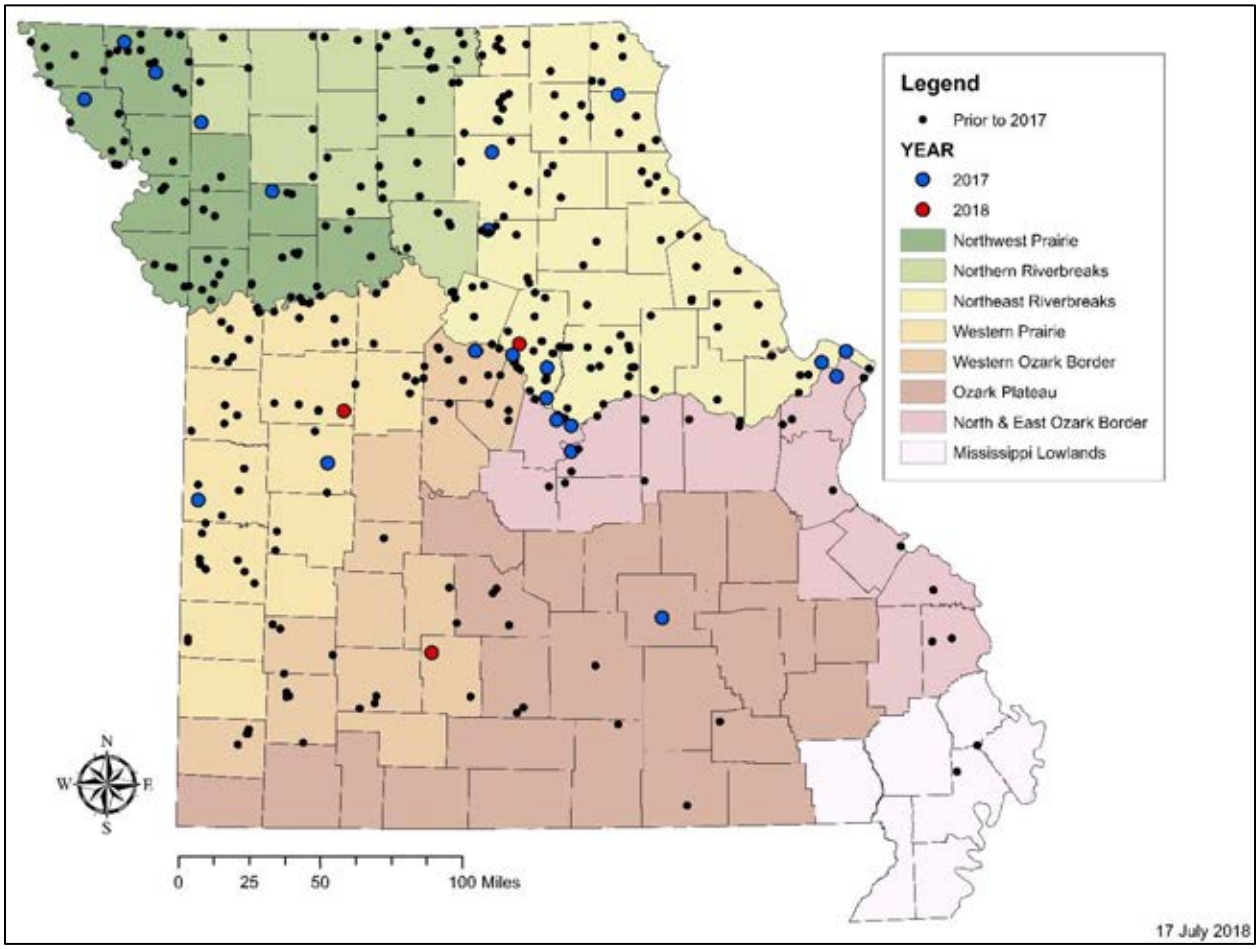

Figure 24. American badger sightings in the Missouri Natural Heritage database range from the 1940s to present and occur in all 8 zoological regions. This includes the 24 additional records from 2017 and 2018.

Considered a furbearing species in the state of Missouri, American badgers are harvested annually during the trapping season. However, harvest has been historically low compared to other furbearers because American badger pelts are not as desirable and typically sell for lower prices than other, more valuable pelts (Figure 25). Furthermore, most American badger harvest occurs as a result of removing nuisance animals. In recent decades, harvest has declined and is likely a result of several factors. First, grasslands and prairies, where the soil substrate is suitable for burrowing, are primary habitat types for American badgers. As these habitats are converted to intensive agriculture, available habitat for American badgers decreases, mostly due to the loss of prey species in these areas. Second, interest in trapping also has declined and fewer individuals participate in trapping.

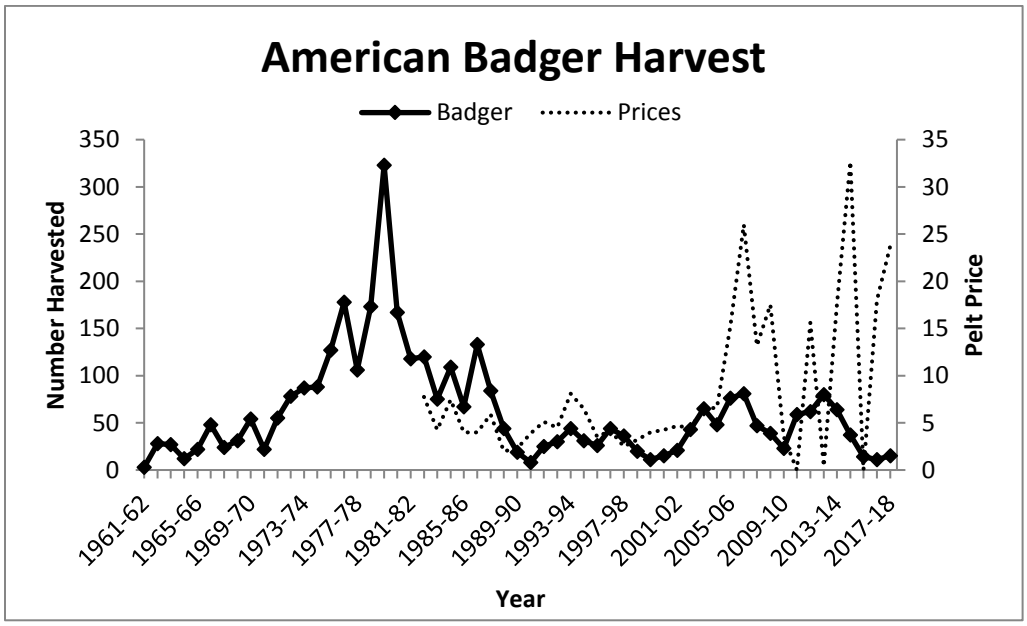

Figure 25. American badger harvest (1961 to present) and pelt prices (1983 to present) in Missouri.

To offset the reduced number of sightings and low harvest, MDC made a concerted effort to collect and record American badger observations and specimens from citizens (e.g., trappers) and MDC personnel from 2009 through 2011 to better understand the demographics and distribution of American badgers in Missouri. As a result, more than 300 records occur within the Missouri Natural Heritage database allowing the Department to determine where the species is most prevalent in the state. Since 2011, sightings and specimens have been collected opportunistically and MDC will continue to collect information about American badgers from citizens and MDC personnel. Beginning in November 2017, MDC once again made a call for American badger sightings with the distribution of a flyer to the MTA, MDC Regional Offices, and State Parks (Figure 26). This renewed effort produced 24 new reports of American badgers across the state, but primarily in the four suitable zoological regions mentioned previously (Figure 24).

Figure 26. Rare furbearer sightings request flier distributed by Missouri Department of Conservation in 2017.

RARE FURBEARERS OF MISSOURI

Missouri residents are fortunate to reside in a state with abundant natural resources, including wildlife, and an exceptional diversity of furbearing species. As a result, opportunities for observing wildlife, hunting, and trapping also are abundant. Three traditional furbearing species, the eastern spotted skunk (subspecies plains spotted skunk), least weasel, and long-tailed weasel, recently (within the last 3 decades) exhibited declines in population trends and harvest. The Missouri Department of Conservation (MDC) decided to close trapping for those species due to this significant decline.

The subspecies of **eastern** s**potted skunks** native to Missouri is the plains spotted skunk. This species was once abundant, albeit not as abundant as their striped cousins, and harvest of 30,000 or more individuals each year was common in Missouri. Declines in annual harvest began in the late 1940s as total harvest dropped precipitously from a high point of more than 55,000 to less than 10,000 individuals over a period of 7 years. After another 5 years, annual harvest dipped to less than 1,000 individuals until harvest dropped to less than 10 each year and MDC closed the season for spotted skunks in 1991-92 (Figure 27). Currently, the plains spotted skunk is listed as **state Endangered** and state-ranked as a **critically imperiled Species of Conservation Concern** in Missouri. Records of spotted skunk sightings are maintained in the Missouri Natural Heritage database, which tracks locations of all Missouri species of conservation concern (Figure 28).

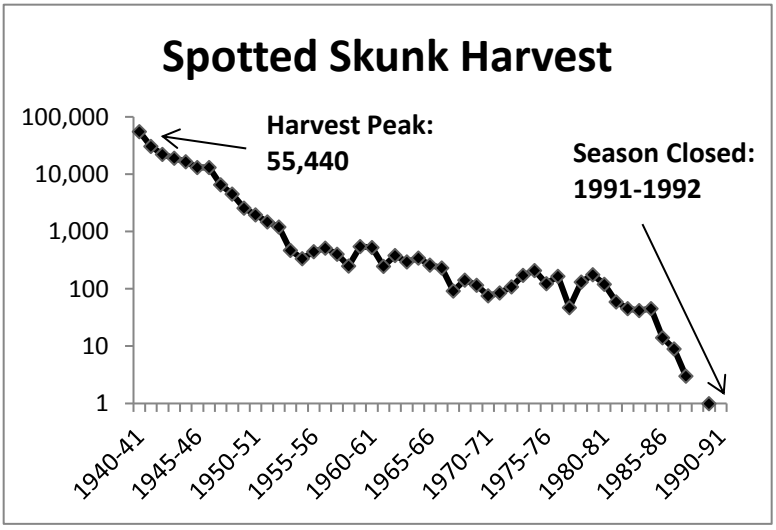

Figure 27. Historic spotted skunk harvest in Missouri from the harvest peak in 1940-41 to the close of the spotted skunk trapping season in 1991-92.

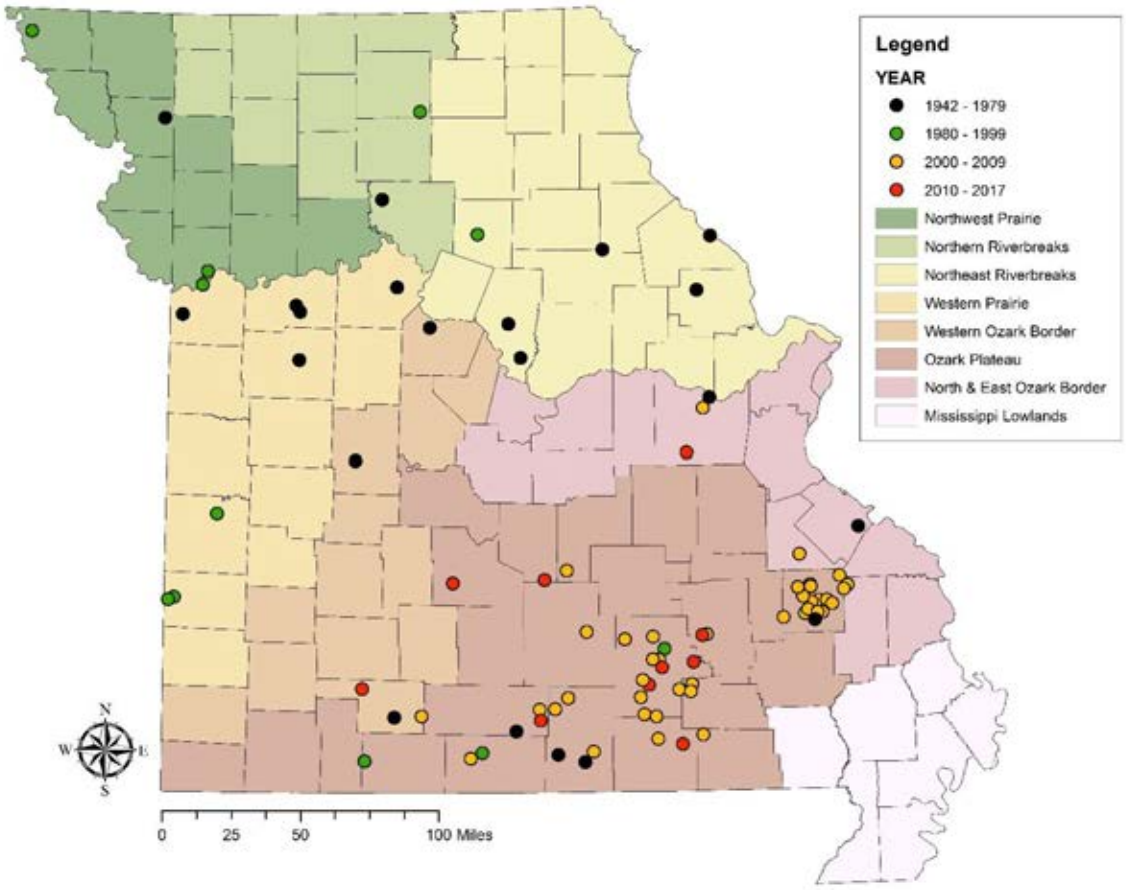

Figure 28. Plains spotted skunk sighting locations in the Missouri Natural Heritage database.

Northern Missouri is the southern extent of the **least weasel's** range, therefore the species was never widespread in the state. Although traditionally considered a furbearer, Missouri's *Wildlife Code* does not define least weasels as a furbearing or game species. Conversely, **long-tailed weasels** can be found from central Canada into portions of South America and thus, can be found throughout the state of Missouri. Long-tailed weasels are the primary target of weasel trapping efforts in Missouri, but harvest records indicate an overall 'weasel' category suggesting take of both species occurred. Weasels were never a large proportion of the fur harvest in Missouri, but harvest peaked in the mid-1930s before steadily declining until the season was closed in 2000-01 (Figure 29).

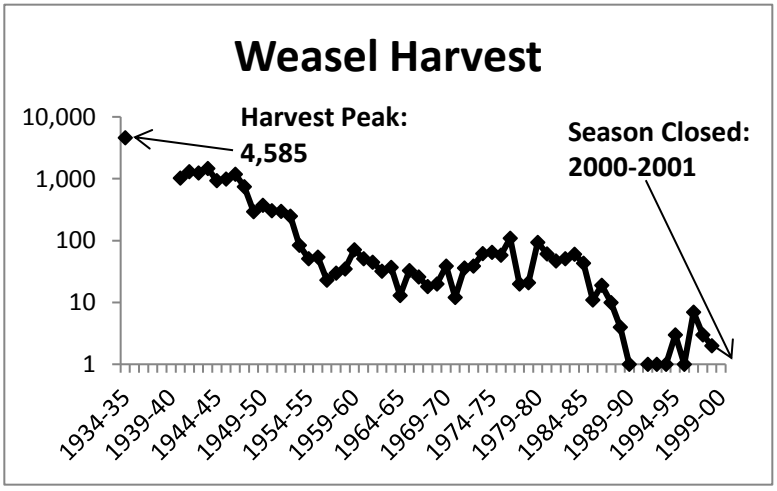

Figure 29. Historic weasel harvest in Missouri from the harvest peak in 1934-35 to the close of the weasel trapping season in 2000-01 with a gap in harvest data from 1935-36 through 1939-40.

Currently, both weasel species are classified as **Species of Conservation Concern and** state-ranked as **Vulnerable**. Similar to spotted skunks, sightings of both weasel species are maintained in the Missouri Natural Heritage database providing an indication of their distributions in Missouri (Figures 30 and 31).

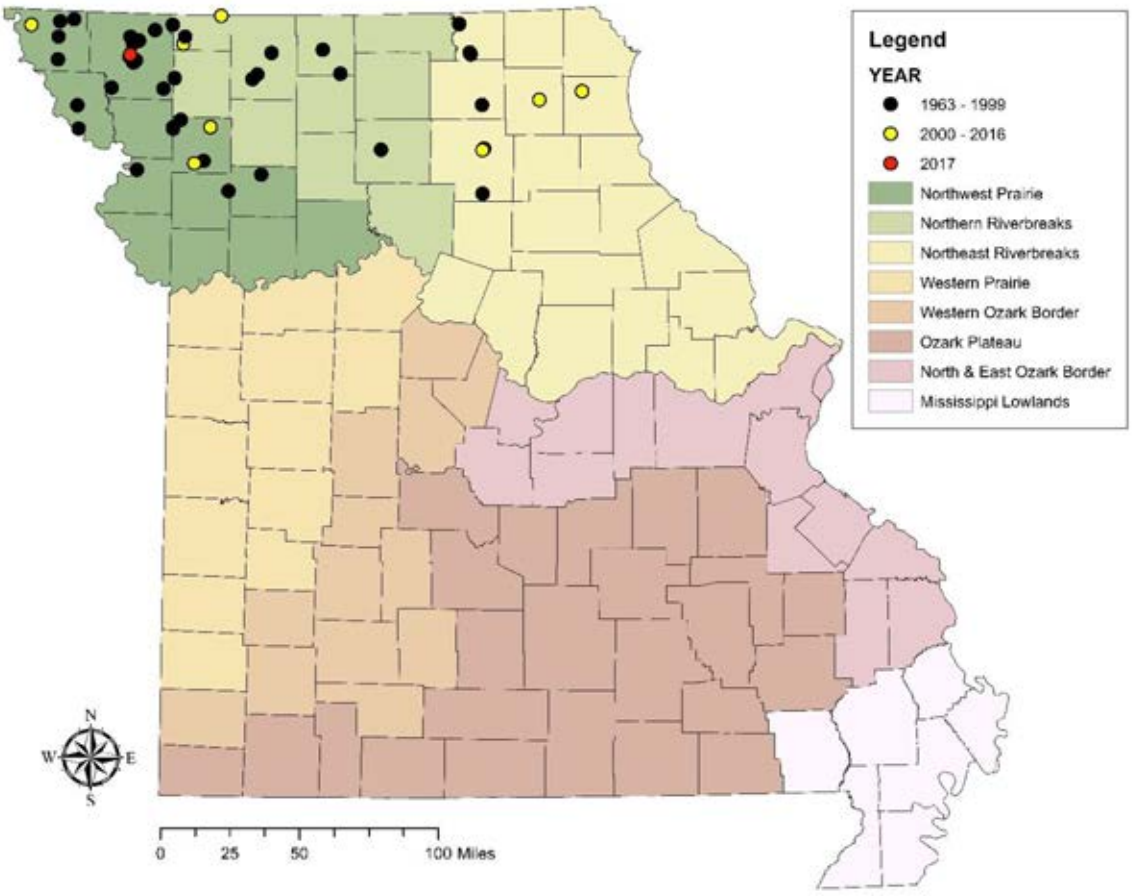

Figure 30. Least weasel sighting locations in the Missouri Natural Heritage database.

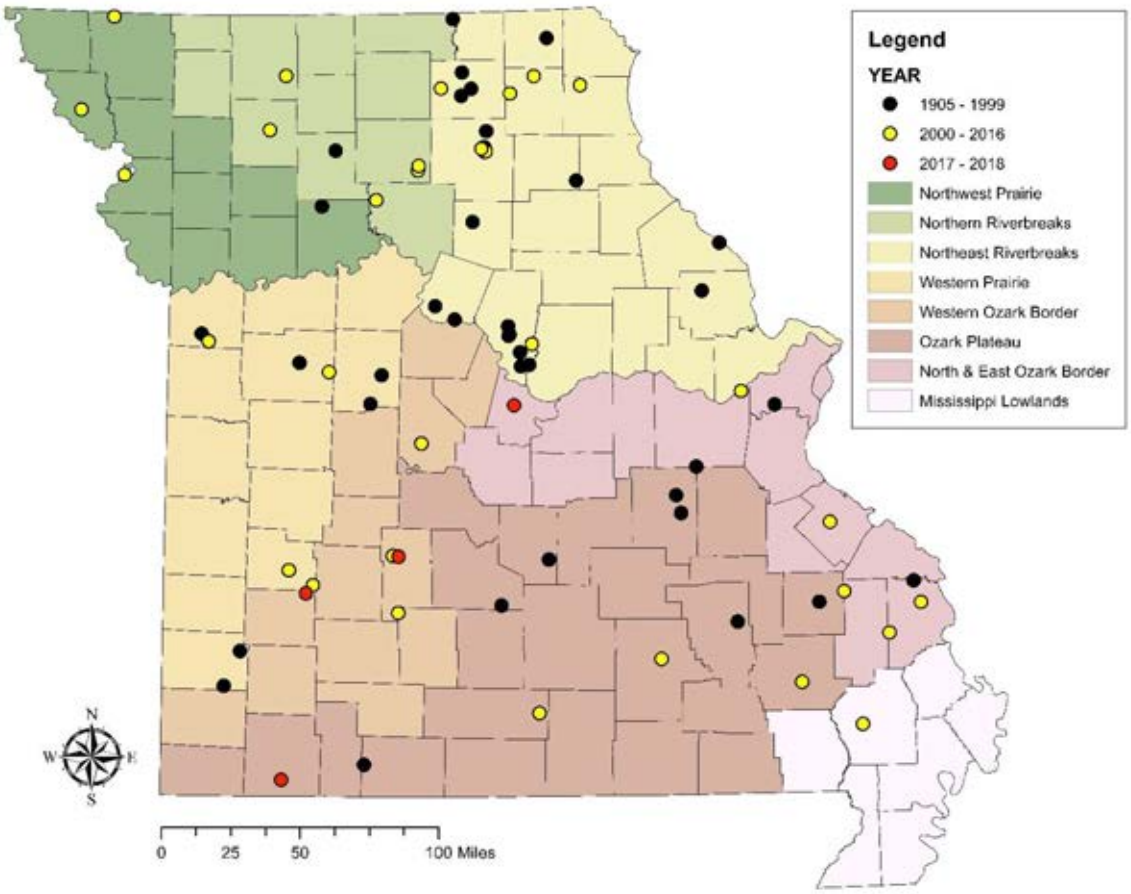

Figure 31. Long-tailed weasel sighting locations in the Missouri Natural Heritage database.

LARGE CARNIVORE RESPONSE TEAM ANNUAL UPDATES

The Missouri Department of Conservation developed a Large Carnivore Response Team (LCRT) in 1996, which was known as the Mountain Lion Response Team (MLRT) prior to 2018, to address the concerns and reports from the public regarding mountain lions and the occasional confirmed occurrence of a mountain lion in the state. The LCRT consists of MDC employees across the state. LCRT members have special qualifications or have received training to address mountain lion concerns and conduct investigations when evidence is present.

All reported mountain lion sightings are categorized and entered into a long-term database. The LCRT also keeps track of confirmed cases of mountain lions in Missouri when there is physical evidence to support a sighting, such as a track, carcass, photo, video, etc. The LCRT has logged over 3,300 reported sightings in the database since 1994. During this time period there have been 72 mountain lion observations confirmed in the state (Figure 32). Mountain lion confirmations continue to increase in the Midwest, and Missouri has confirmed more mountain lion incidents than any other state without a resident population of mountain lions. Mountain lion confirmations in Missouri are primarily the result of game camera photos or videos (72.2%), followed by mountain lion carcasses (11.1%), and DNA confirmations from hair and elk/deer carcasses (9.7%, Figure 33). Genetic analyses indicate origins of South Dakota (n=6), Montana (n=1), Wyoming (n=1), and Colorado (n=1). Prior to 2016, all DNA confirmations were male mountain lions. However, in February of 2016, a three-year-old cow elk, suspected to be affected by brain worm, was killed by a mountain lion. Genetic analyses of samples collected from the elk carcass revealed the mountain lion was a female with a probable population of origin in the Black Hills of Wyoming and South Dakota, and northwest Nebraska. When sex and age can be determined, most mountain lions confirmed in Missouri are dispersing sub-adult males, which is consistent with other Midwestern states. Additionally, Missouri genetically "recaptured" a mountain lion for the first time in April 2018 when it detected a male mountain lion that was first detected in the state in 2012. Breeding has not been documented in Missouri.

There have been **3 mountain lion confirmations** since June 2017. The six-county region of Shannon, Texas, Oregon, Carter, Ripley, and Reynolds counties continues to be a "hot-spot" for confirmations with 1 of the last 3 confirmations falling in this region. Two of the last 3 confirmations were adjacent to the "hot-spot" in Iron and Madison Counties. Two of the recent confirmations were trail camera photos and the third was a combination of an elk carcass, with resulting mountain lion DNA, and a track. In the last year, **340 reports were submitted** to the LCRT via the website reporting form and e-mail account associated with the LCRT; however, this is a minimum count because many reports that are sent to local agency staff (e.g., Sheriff's departments, state police, etc.) are not recorded. For more information on mountain lions in Missouri, or to submit a report, please visit: https://nature.mdc.mo.gov/discover-nature/report-wildlife-sightings/mountain-lion-reports

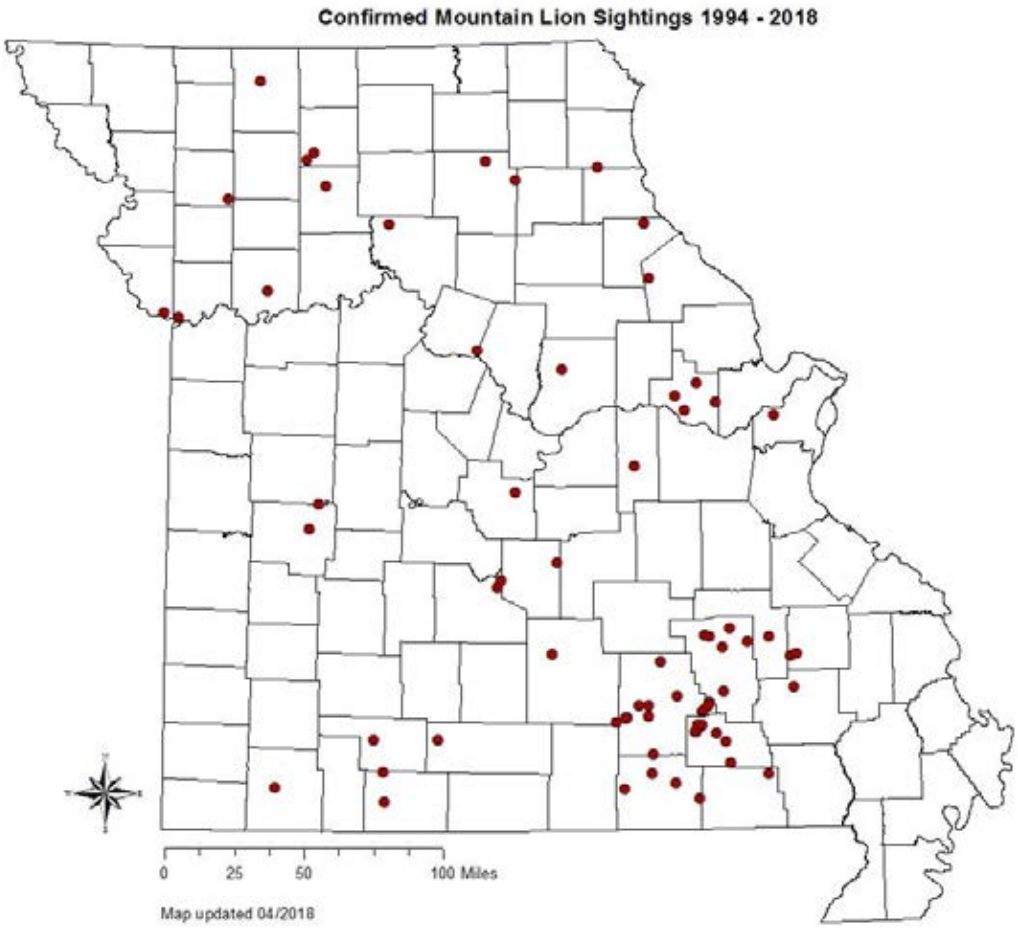

Figure 32. Geographic distribution of the 72 mountain lion confirmations in Missouri from 1994 to 30 June 2018.

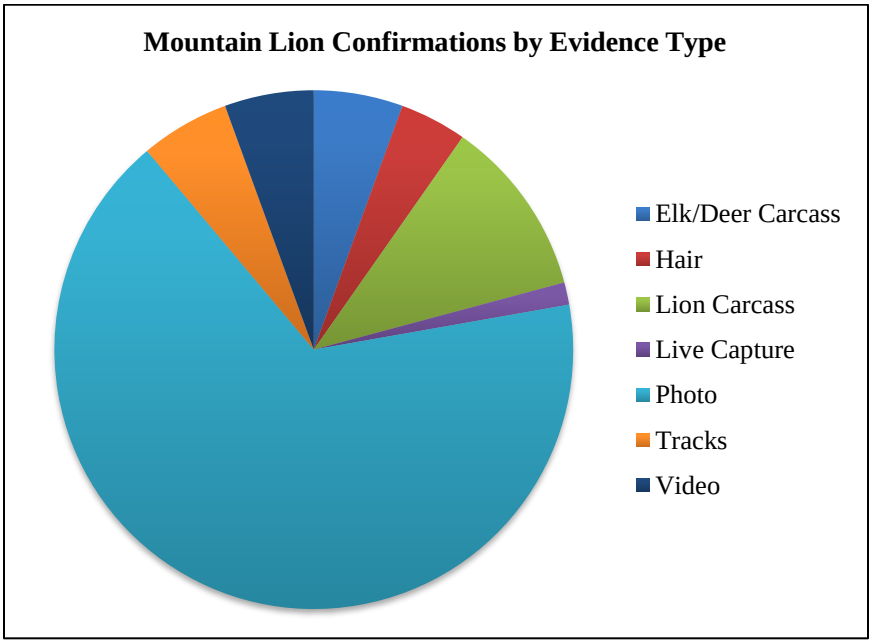

Figure 33. The proportion of mountain lion confirmations made by each type of evidence.

GRAY WOLF SIGHTINGS IN MISSOURI

Missouri likely is not the first state to come to mind when thinking about the gray wolf. The state has not had a resident wolf population in approximately 200 years due to hunting pressure and habitat loss in the 1800s. However, with the Missouri and Mississippi rivers, two major river systems, coursing through the state, Missouri is a prime location for dispersing large carnivores (Figure 34).

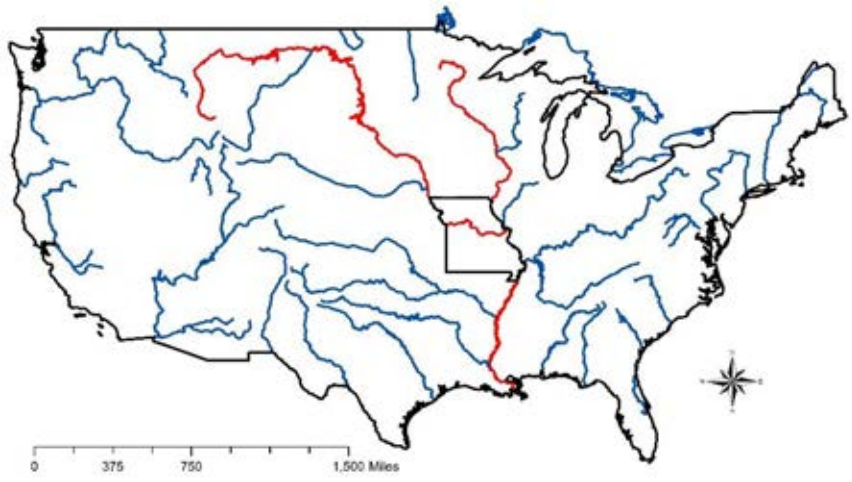

Figure 34. Both the Missouri and Mississippi Rivers (red) flow through or past Missouri and provide travel corridors from populations of gray wolves in the Great Lakes.

Since 2001, Missouri Department of Conservation has recorded 30 reports of gray wolves. In total, 6 free-ranging wolves have been confirmed within state boundaries (Figure 35). The most recent confirmation occurred in January 2018 when an 85-pound, male wolf was killed by a vehicle on Interstate 70 in Montgomery County. Four of the other confirmations were mistaken for coyotes during hunting activities and the remaining confirmation was incidentally harvested during trapping activities (Table 5).

Wolves by no means are returning to Missouri, but the state's proximity to an expanding gray wolf population in the western Great Lakes region sets the scene for young, dispersing "loner" wolves to wander across the border.

Table 5. Summary of information from confirmed instances of gray wolves in Missouri.

Year	County	Sex	Age	Weight	Origin
2001	Grundy	Male	2.5	80	Michigan
2010	Carroll	Male	Unknown	103	Unknown
2011	Clinton	Unknown	Unknown	Unknown	Great Lakes
2012	Howard	Male	Unknown	81	Great Lakes
2013	Wayne	Female	Unknown	72	Unknown
2018	Montgomery	Male	Unknown	85	Great Lakes

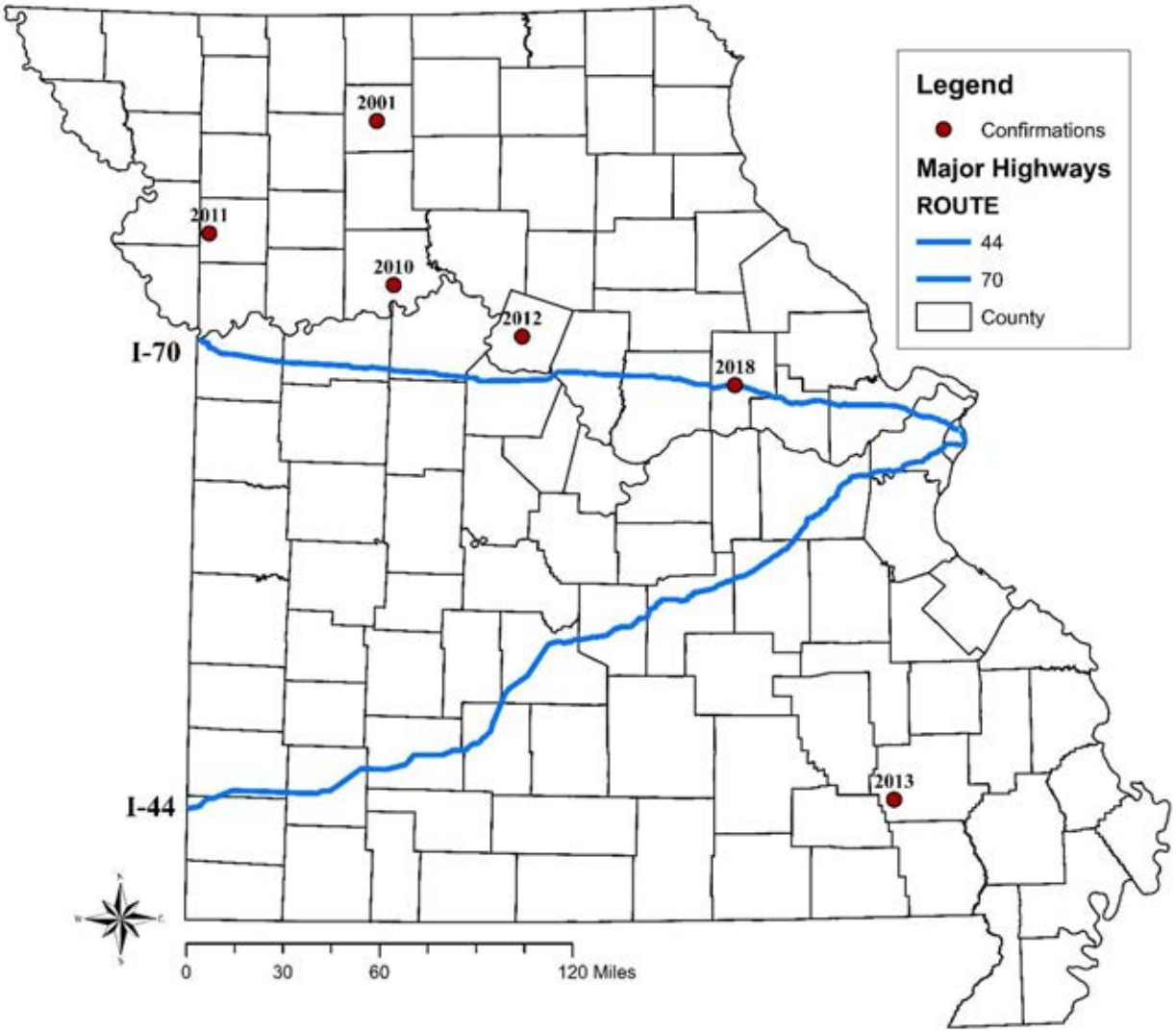

Figure 35. Geographic distribution of the 6 gray wolf confirmations in Missouri.

BLACK BEAR SIGHTINGS IN MISSOURI

Citizen reports of black bear sightings are important for delineating Missouri bear range expansion, defining breeding range using reports of cubs, and identifying travel corridors based on habitat. Black bear sightings are reported to local MDC staff and through an electronic reporting system available on the MDC website.

https://nature.mdc.mo.gov/discover-nature/report-wildlife-sightings/bear-reports/report-bear-sighting

A total of 346 reports was received between 1 July 2017 and 30 June 2018 (Figure 36). Direct observations are the most common type of report, followed by trail cameras, interactions (e.g., bear getting into the trash, eating from a bird feeder, etc.), bear sign (e.g., tracks or scat) and mortalities (e.g., roadkill). The chart to the right depicts the proportions of report types.

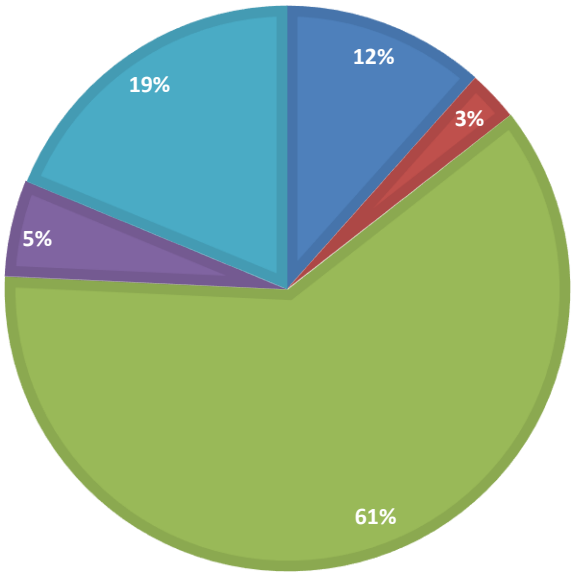

Figure 36. Chart depicting proportions of Missouri black bear reports as 61% observations, 18% trail cameras, 11% interactions, 5% bear sign, and 2% mortalities.

Primary bear range (marked in red) generally occurs south of Interstate 44, while predicted expansion areas (marked in blue) extend further north and east, and dispersing young males have been documented in many other parts of the state (Figure 37). As populations expand, black bear reports will likely increase and as bears move into expansion areas that include urban areas such as St. Louis and Springfield, interactions also will likely increase.

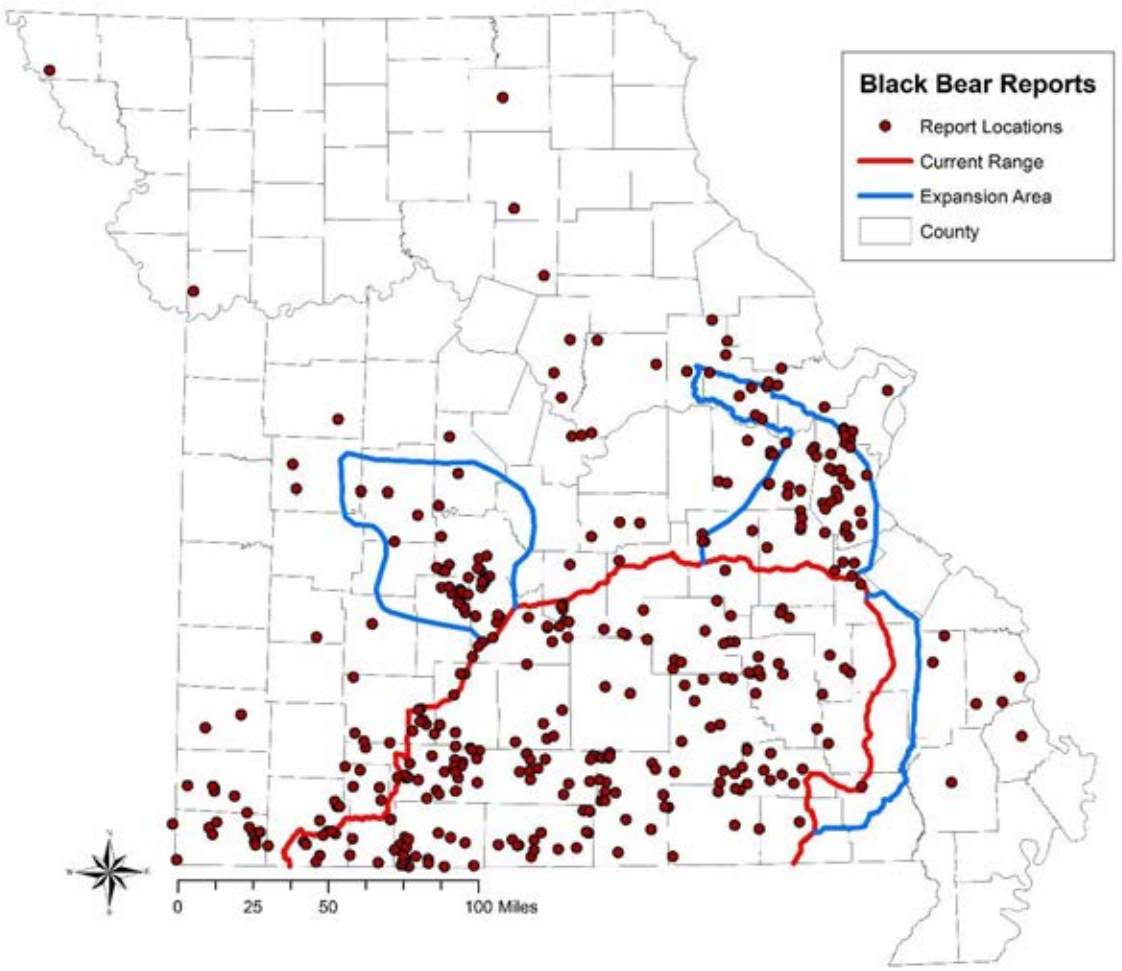

Figure 37. Black bear reports in Missouri from 1 July 2017 to 30 June 2018 with current bear range in red and expansion areas in blue.

STATE FURBEARER RECORDS

Official furbearer weight records began being kept in 2011. Candidate furbearers must be brought to one of the statewide fur auctions or to the Central Regional Office in Columbia for weighing on a certified scale. **Two new** record-sized furbearers were harvested in the 2017-18 hunting and trapping seasons (Table 6). Additionally, the record weight for badgers is currently tied. Please note that some larger weights may have occurred prior to official record keeping in 2011, but cannot be considered record weights at present.

Table 6. Current record-holders of exceptionally sized furbearing species.

Current Record Furbearers						
Species	**Sex**	**Date Taken**	**County Taken**	**Weight (lbs.)**	**Ounces (oz.)**	**Hunter/Trapper**
Badger	M	17 Dec 2014	Perry	28	14.4	Corey Robinson
NEW Badger	M	21 Nov 2017	Randolph	28	14.4	Glen & Kyle Fessler
Beaver	M	17 Dec 2014	Marion	73	0	Jeff Dornberger & Blaine Pope
Bobcat	F	18 Jan 2014	Macon	36	0	Shane Viers
Coyote	M	2 Dec 2015	Vernon	48	0	Tyler Shouse
Gray Fox	M	2 Jan 2016	Marion	12	11	Lance Hudson & Bobby Gruenloh
Mink	M	19 Jan 2013	Ralls	5	3.2	Jeff Thompson
Muskrat	M	27 Nov 2016	Marion	4	0	Blaine & Teagan Pope
Nutria	M	2 Feb 2014	Pemiscot	15	12.8	Charlie Brown
Opossum	M	18 Dec 2016	Lincoln	16	2.6	Jacob Doll
Raccoon	M	4 Dec 2015	Gentry	28	8	Dennis Nelson
Red Fox	M	18 Dec 2015	St. Francois	13	0.4	Justin Skiles
River Otter	M	29 Dec 2016	Taney	32	5.6	Mark Visnosky
NEW Striped Skunk	F	20 Dec 2017	Montgomery	7	12	Matthew & Lukas Oliver

CABLE RESTRAINTS IN MISSOURI

In 2004, a cooperative agreement between the Missouri Trappers Association (MTA) and the Missouri Department of Conservation (MDC) was established to provide Missouri resident trappers with training to safely and efficiently use **cable restraints** on land for appropriate furbearers. When used properly, cable restraints hold captured coyotes and foxes without mortalities and with minimal injuries. As with trapping in general, the use of cable restraints is a highly regulated activity in Missouri. Anyone who wishes to trap must hold a valid trapping permit and follow strict rules established and enforced by the Missouri Department of Conservation. Until 2017, trappers were required to take a **certified Cable Restraint Training course** offered at several locations across the state, before using cable restraints. Check the MDC website or *Wildlife Code*, for full regulations on the use of cable restraints in Missouri. Most Missouri resident trappers have been certified since the training course was initiated and there is no longer a requirement to take the course to operate cable restraints; therefore, **2017 was the last year courses were required** (Figure 38).

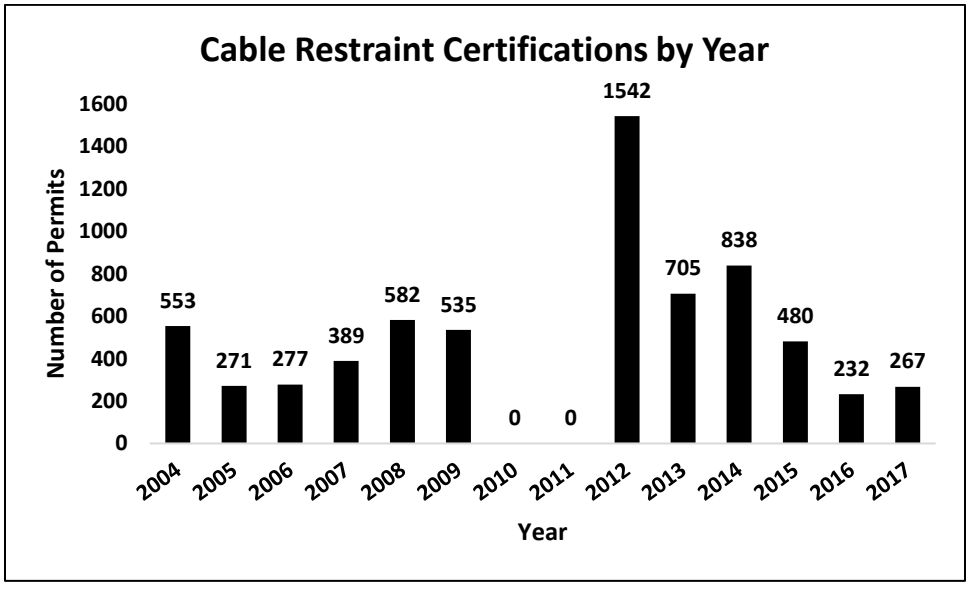

Figure 38. Number of Missouri resident trappers certified to use cable restraints by year.

SECTION II:
Project Updates and Summaries

FURBEARER SIGN STATION SURVEY

Beginning in 1977, annual Sign Station Surveys for furbearers have been conducted each September and October. The purpose of the survey is to collect population trend information for Missouri's furbearing species. Twenty-five routes are distributed throughout the state in 25 different counties. Routes consist of 5 segments with 10 sign stations per segment for a total of 50 stations per route. Each sign station is a 36-inch diameter circle of sifted soil, spaced 0.3 miles along gravel road shoulders. A fatty acid scent disc is placed in the center of each station as an attractant. Each station is operated for one night and evaluated the following day for visitation.

Each station is described as operable or inoperable by the observer, stations with tire tracks or those destroyed by a road grader were deemed inoperable. All operable stations were included in calculations of indices, regardless of track presence, but inoperable stations were not used for calculations. Tracks were identified within the 36-inch circle of the station. Occupancy of a station by a species was recorded, but not the number of individuals per species.

Twenty-four of 25 routes (Figure 39) were completed in 2017 with a total of 988 operable stations out of a possible 1,100. The Clinton and Ozark counties surveys were completed, but unfortunately the data sheets were lost in the mail and could not be included in analysis. A summary of operable stations for each zoological region is presented in Table 7. Inoperable stations were either destroyed with a road grader or had a tire track in them. The most common furbearers to visit stations were raccoon, opossum, and coyotes (Figure 40). The least common were weasels, minks, and gray foxes. Non-mammalian visitors were primarily birds, such as turkeys.

Species specific population index trends from 1977 to 2017 based on the Furbearer Sign Station Survey are displayed in Figures 41 through 47. Most furbearers have an overall increasing trend with the exception of red and gray fox populations, which have been in an overall decline since the initiation of the Sign Station Survey. These trends are reflected in the Bowhunter Observation Index and harvest records as well.

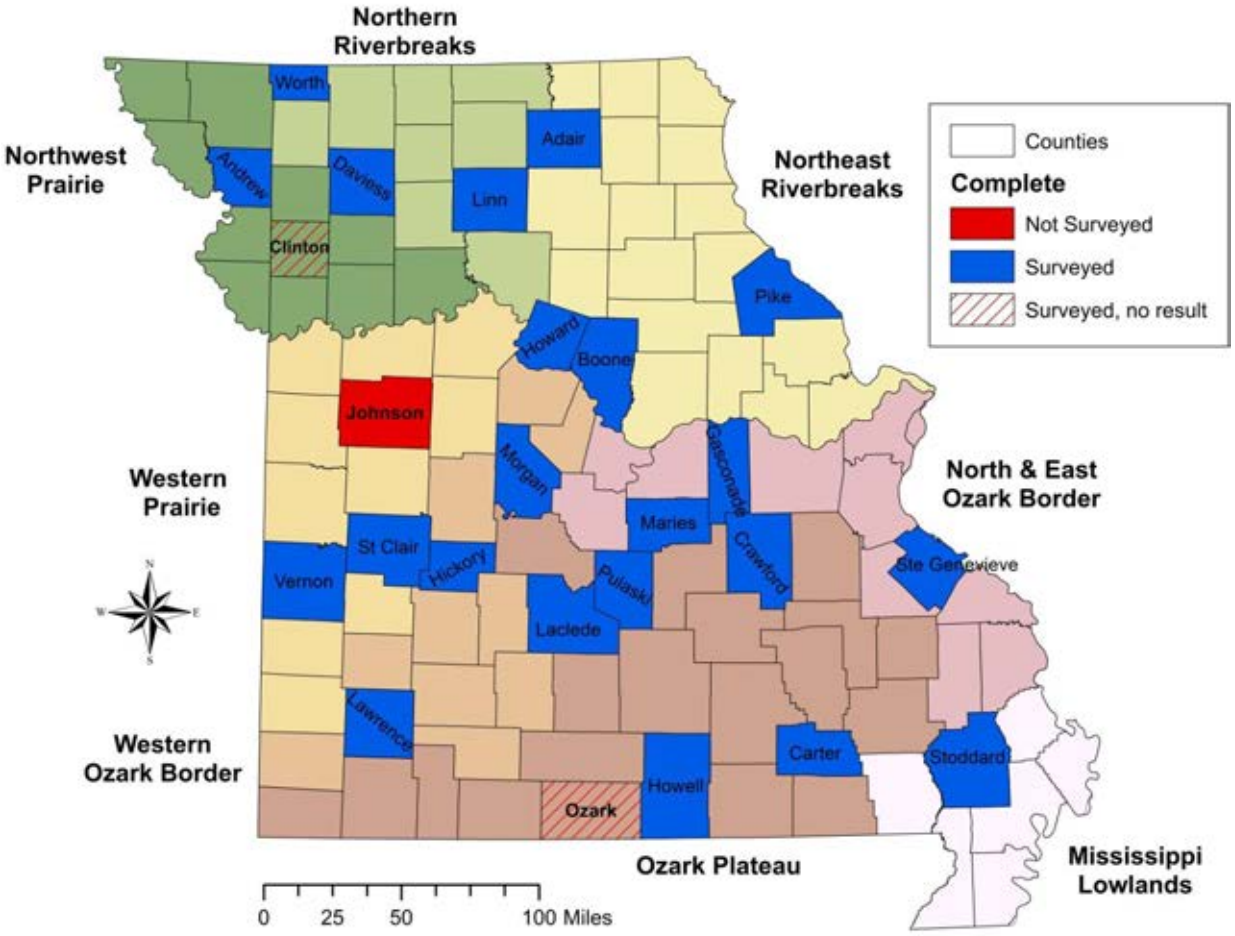

Figure 39. Missouri's 8 zoological regions and counties where surveys were completed (blue) and counties where surveys were not completed (red) in 2017.

Table 7. Summary of surveys completed, operable and inoperable sign stations in 2017 by zoological region.

Zooregion	Routes Completed	Operable Stations	Inoperable Stations
Northwest Prairie	1	43	7
Northern Riverbanks	3	141	9
Northeast Riverbanks	4	180	20
Western Prairie	2	95	5
Western Ozark Border	3	133	17
Ozark Plateau	5	229	21
North & East Ozark Border	3	137	13
Mississippi Lowlands	1	30	20
TOTAL	22	988	112

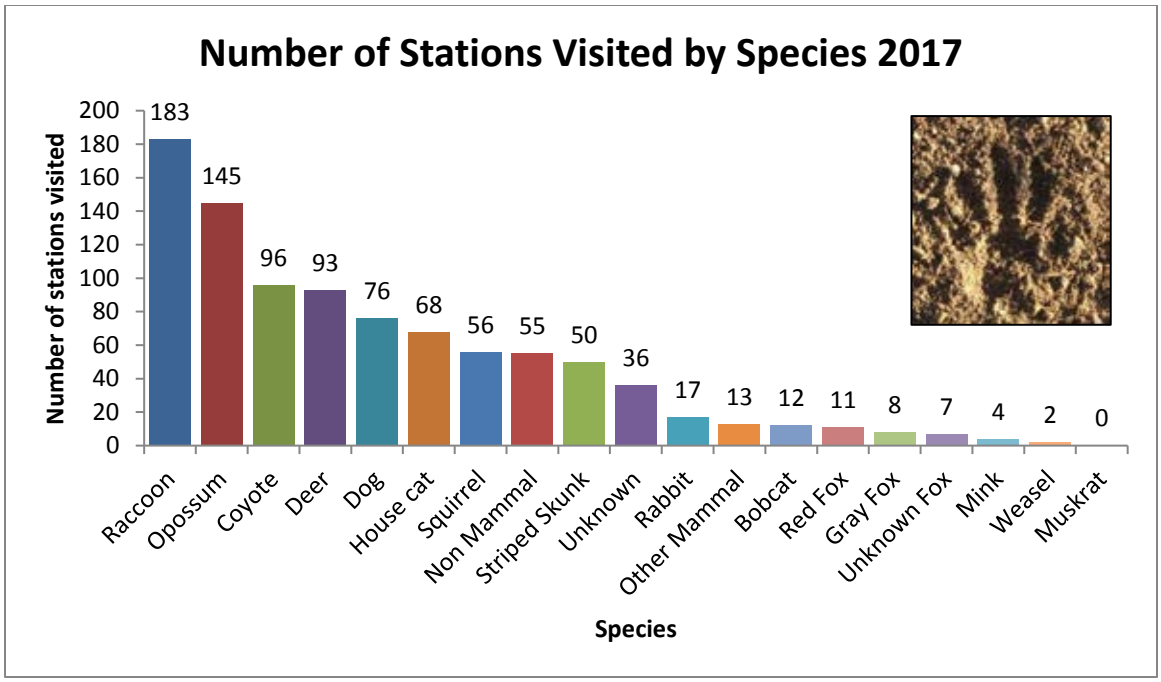

Figure 40. The number of stations visited by each mammal species, including non-furbearer species, out of 988 operable stations in the 2017 Missouri Furbearer Sign Station Survey.

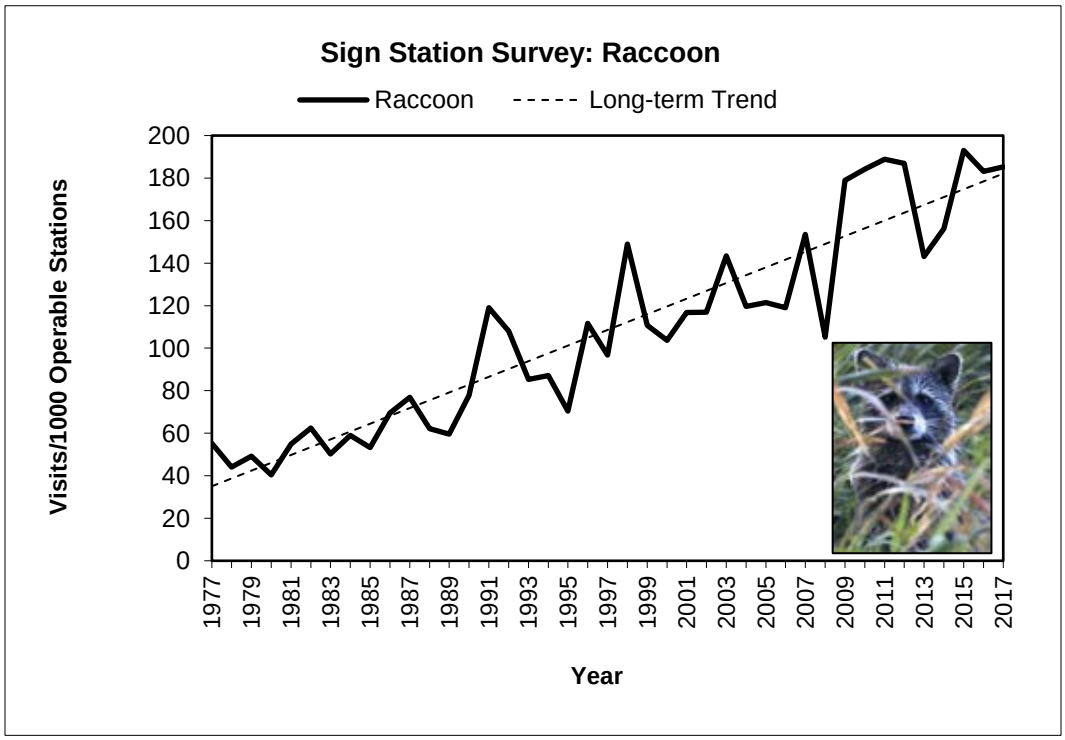

Figure 41. Missouri raccoon population index trends from 1977 to 2017.

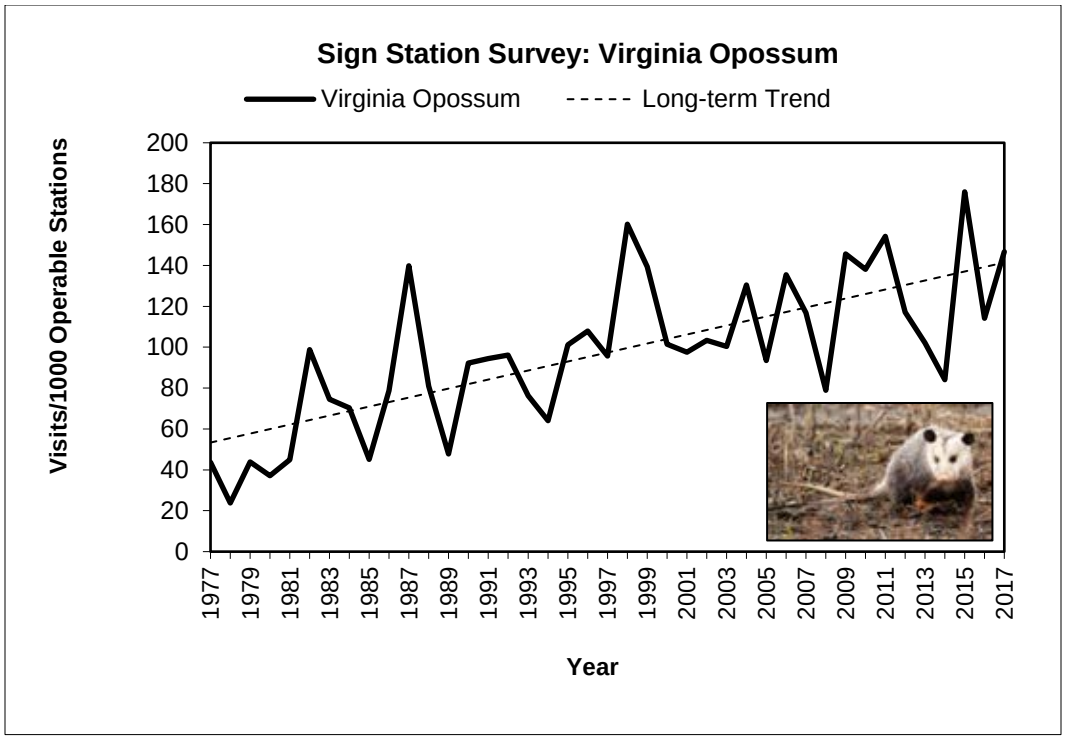

Figure 42. Missouri Virginia opossum population index trends from 1977 to 2017.

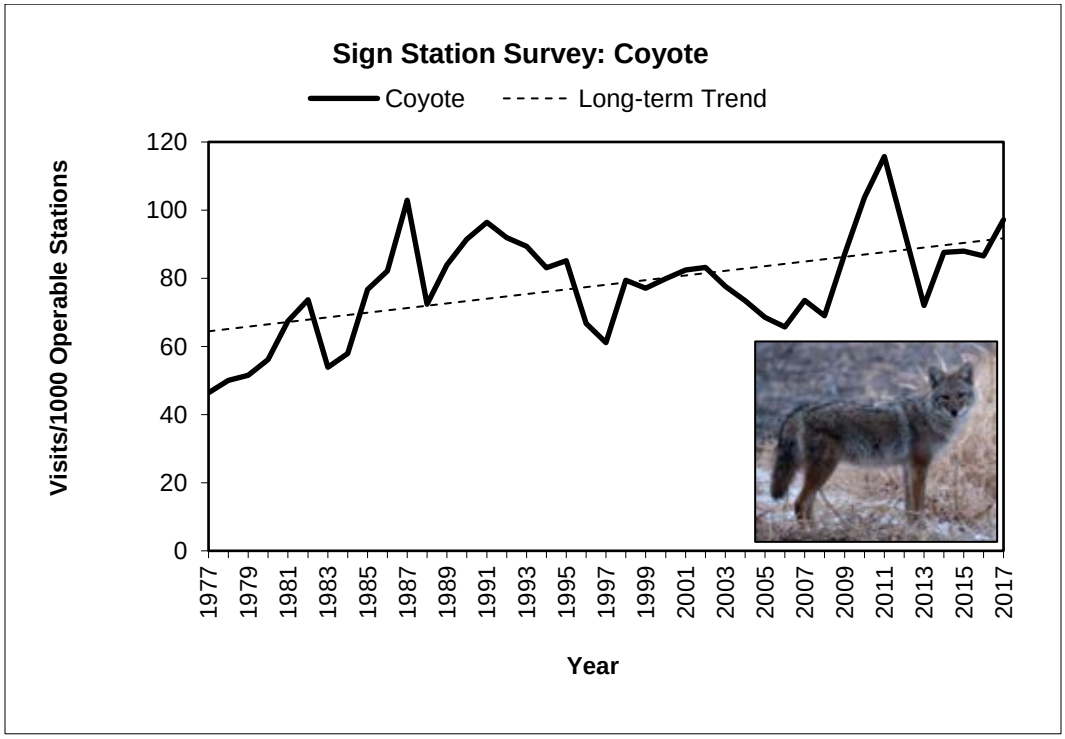

Figure 43. Missouri coyote population index trends from 1977 to 2017.

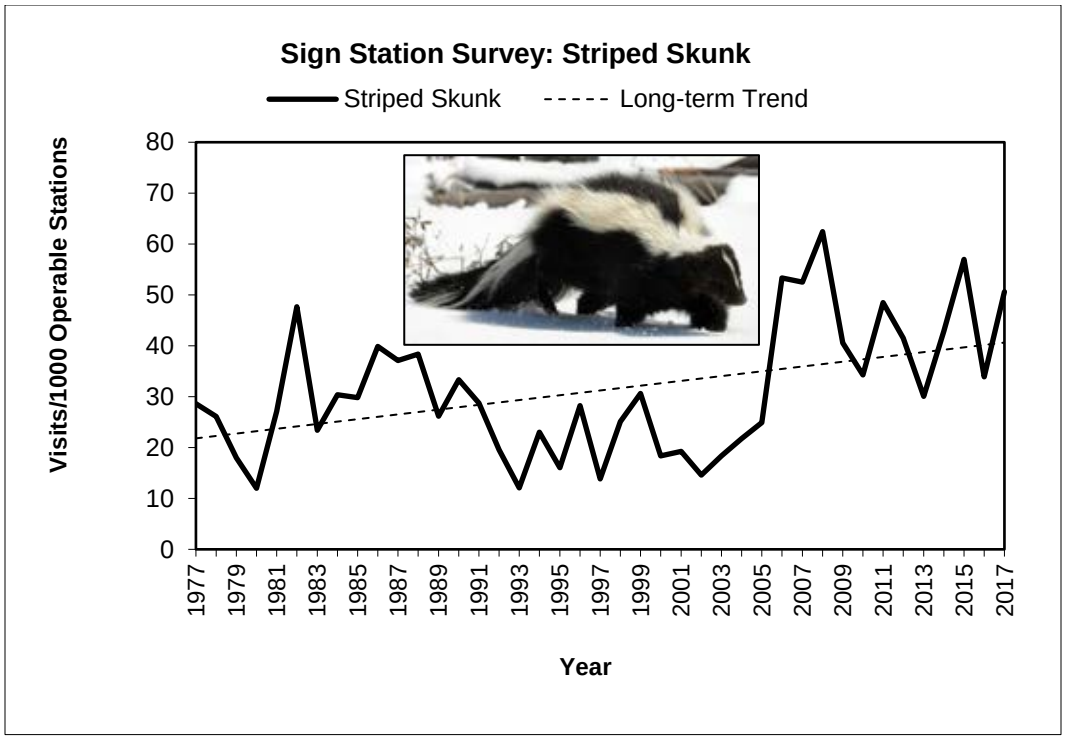

Figure 44. Missouri striped skunk population index trends from 1977 to 2017.

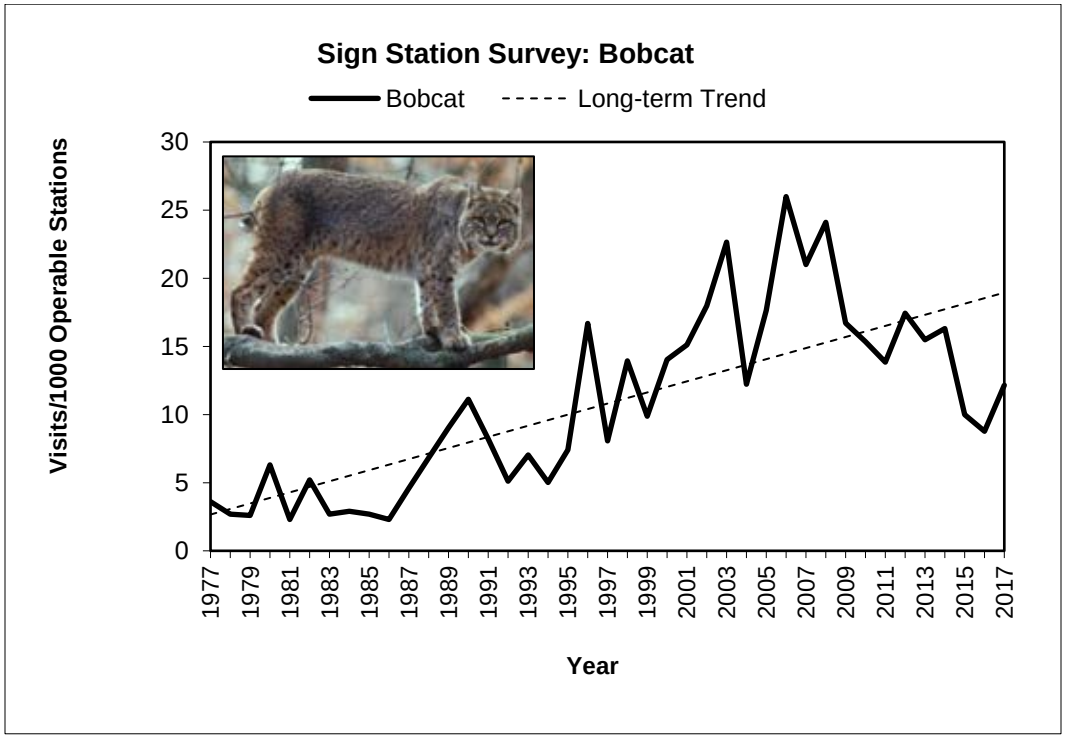

Figure 45. Missouri bobcat population index trends from 1977 to 2017.

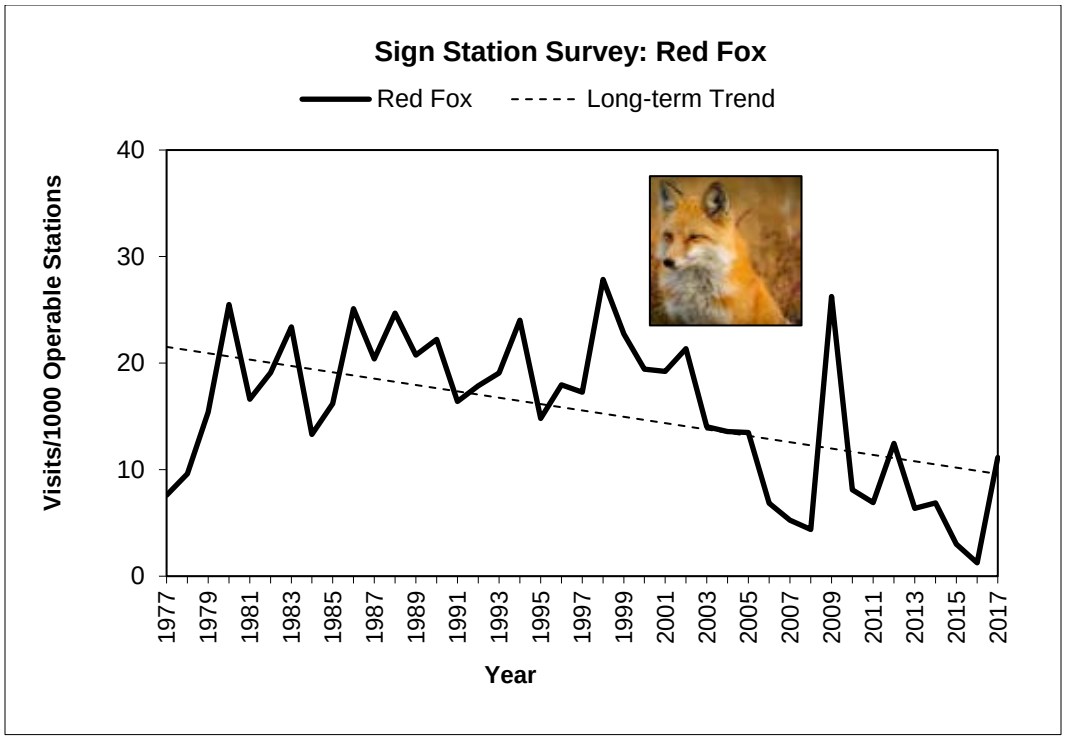

Figure 46. Missouri red fox population index trends from 1977 to 2017.

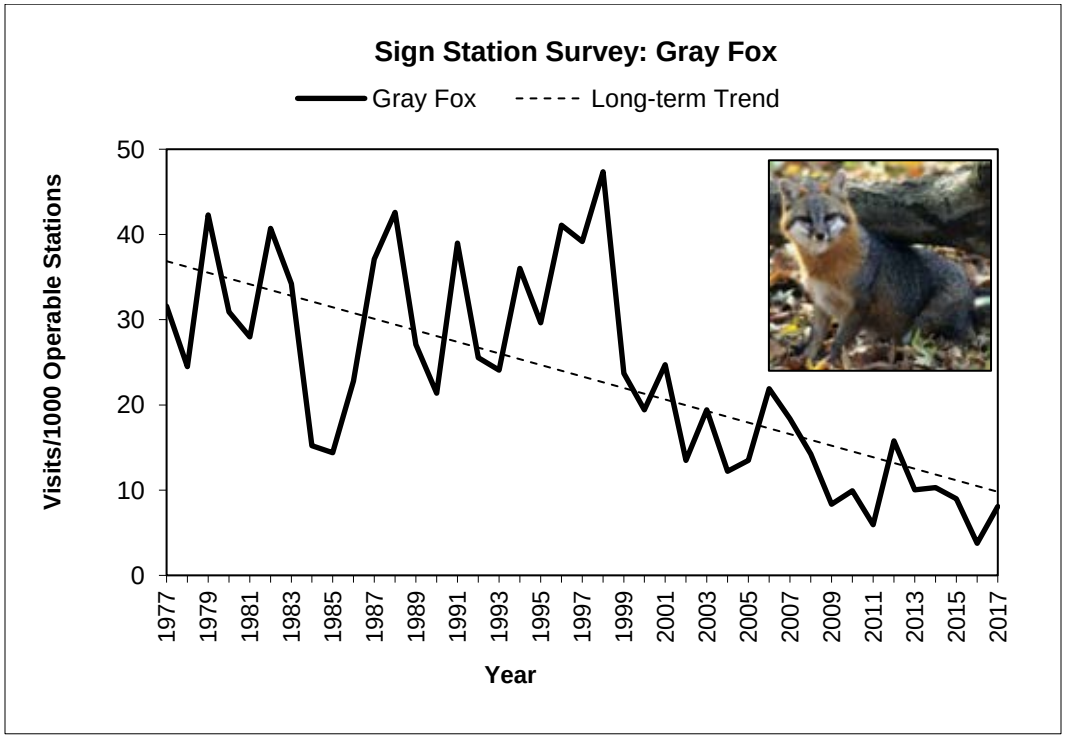

Figure 47. Missouri gray fox population index trends from 1977 to 2017.

ARCHER'S INDEX OF FURBEARER POPULATIONS

Missouri Department of Conservation has conducted annual surveys of wildlife populations via the Bowhunter Observation Survey for 35 consecutive years (1983-2017). Each fall, several thousand archery deer and turkey hunters keep daily observation records of furbearers, other small game animals, deer, and turkeys. Archers volunteer through post-season surveys, articles in the *Missouri Conservationist* magazine, and during sign-ups at bowhunter club meetings and other outdoor events. Archery hunters are asked to record the number of hours hunted, during both morning and evening hunts, and to use a standardized daily diary to record hours and sightings of wildlife. MDC uses the number of sightings of each species divided by the total number of hours hunted statewide to calculate a sighting index which is expressed as sightings per 1,000 hunter hours, called the Archer's Index.

Wildlife population indices calculated from archer's diaries are useful trend indicators for terrestrial wildlife species, such as coyotes, raccoons, foxes, and bobcats. Hunters are well distributed statewide with volunteers in all counties during most years. Bowhunters averaged 54,588 hours per year in the stand over the last 35 years, and ranged from 30,990 hours in 1985 to 98,898 hours in 2017 (Table 8). In 2017, hunters spent **98,898 total hours** in the stand, which is the highest recorded hours in the history of the survey.

Line graph representations of Archer's Indices for several furbearer species are shown in Figures 48 through 53. Based on these indices, long-term raccoon, bobcat, coyote, and opossum observations suggest population increases. Striped skunk populations are relatively steady, while observations suggest a downward trend for red and gray fox populations despite index increases the last two years. Wildlife population indices are also depicted by county (Table 9).

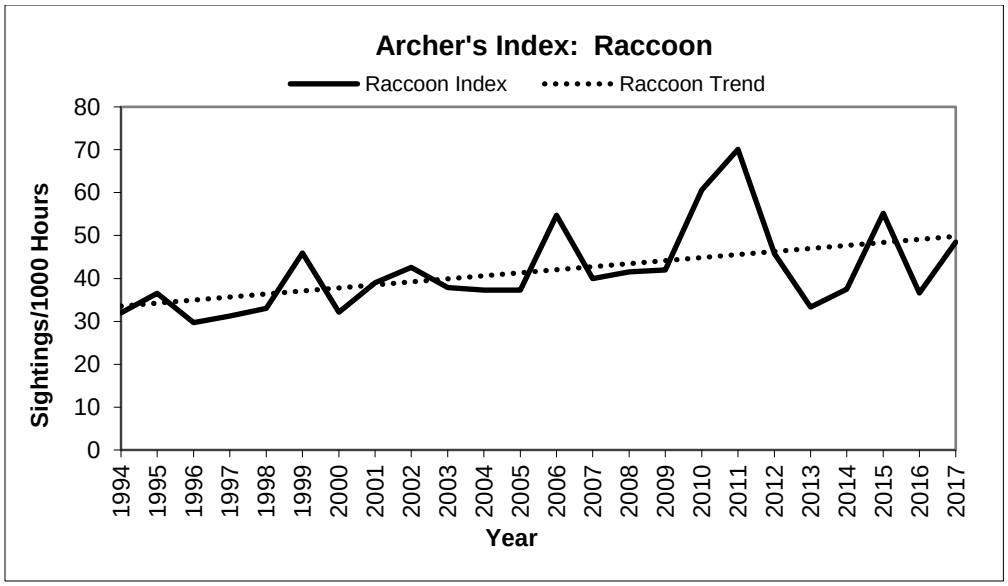

Figure 48. Raccoon population trend in Missouri based on the Archer's Index, derived from the MDC Bowhunter Observation Survey.

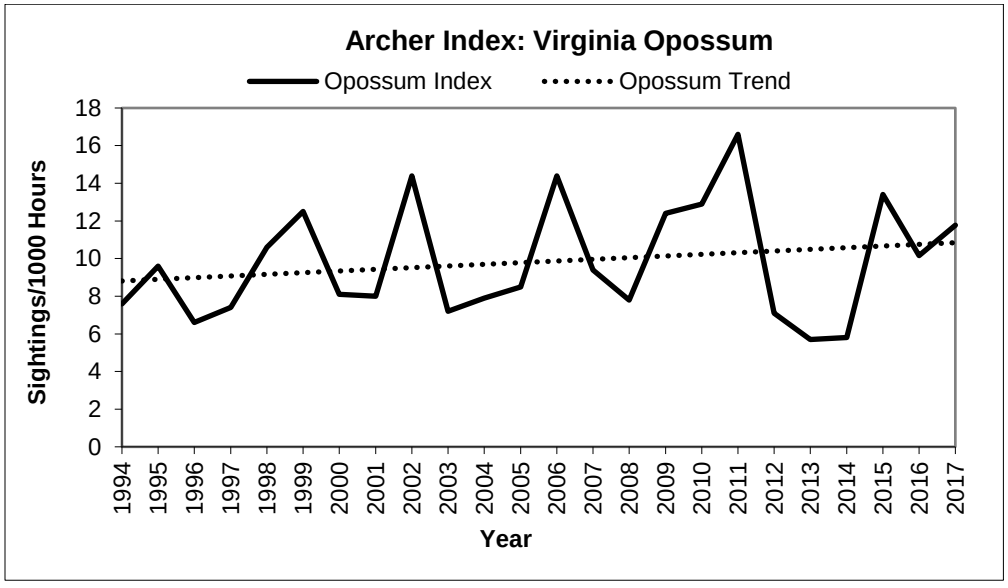

Figure 49. Virginia opossum population trend in Missouri based on the Archer's Index, derived from the MDC Bowhunter Observation Survey.

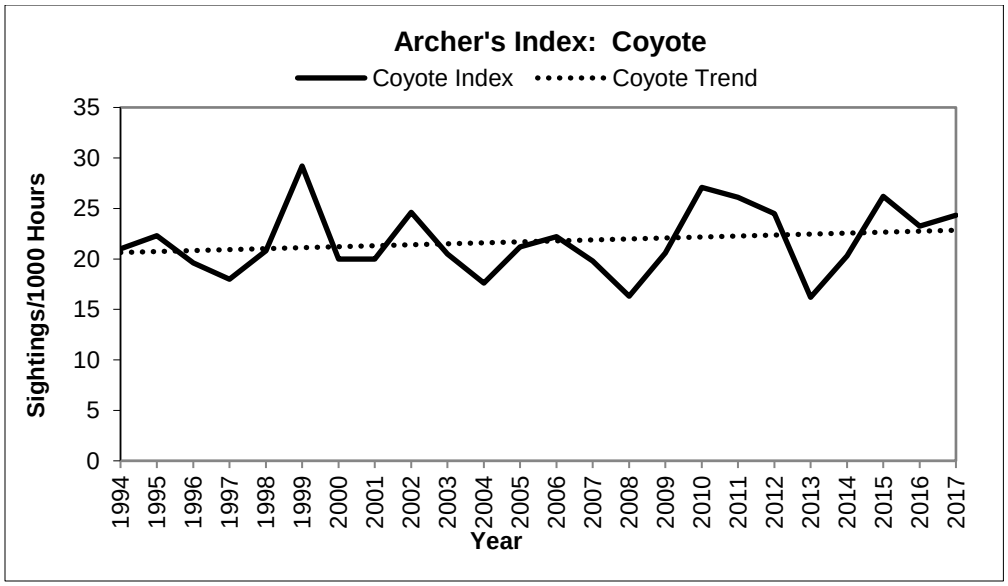

Figure 50. Coyote population trend in Missouri based on the Archer's Index, derived from the MDC Bowhunter Observation Survey.

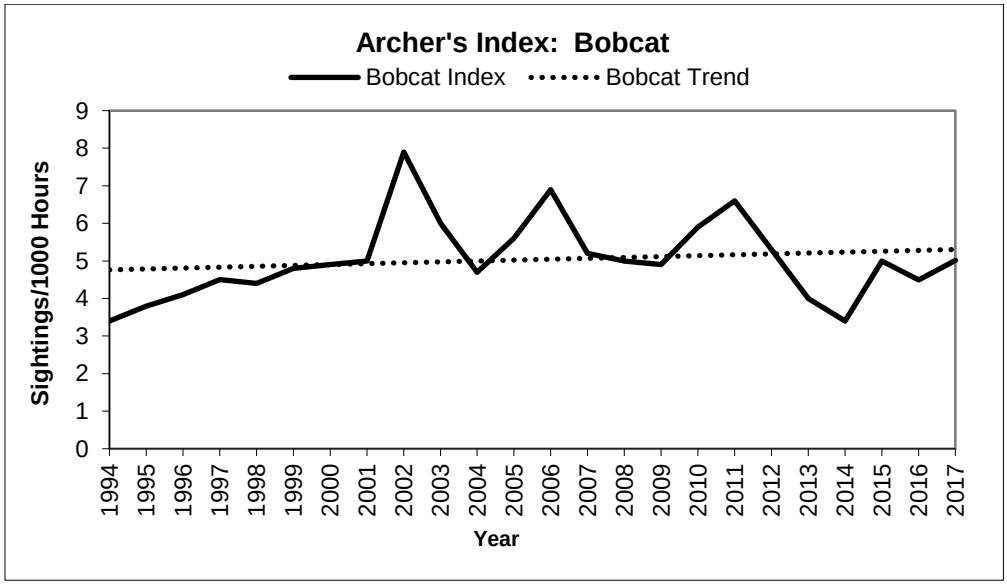

Figure 51. Bobcat population trend in Missouri based on the Archer's Index, derived from the MDC Bowhunter Observation Survey.

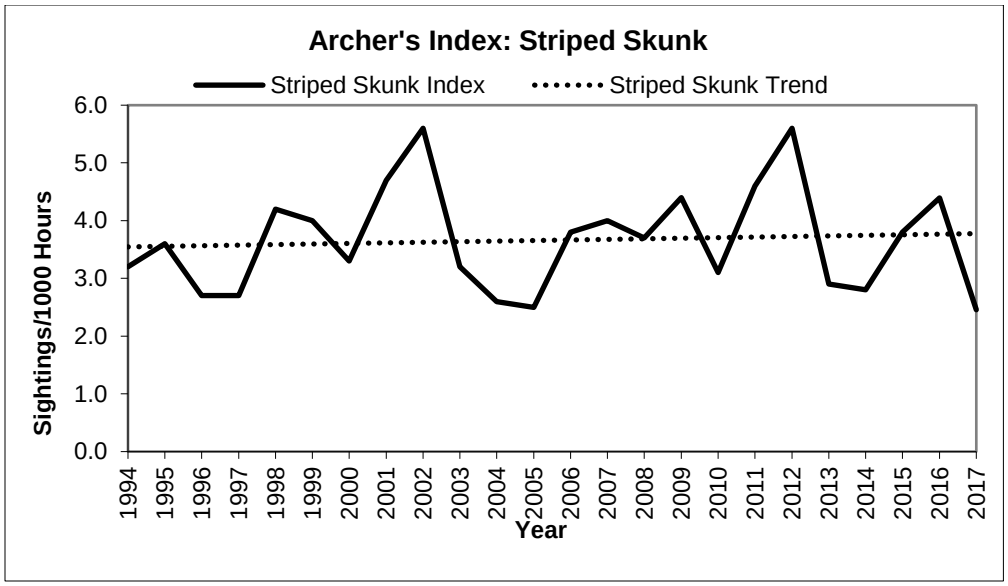

Figure 52. Striped skunk population trends in Missouri based on the Archer's Index, derived from the MDC Bowhunter Observation Survey.

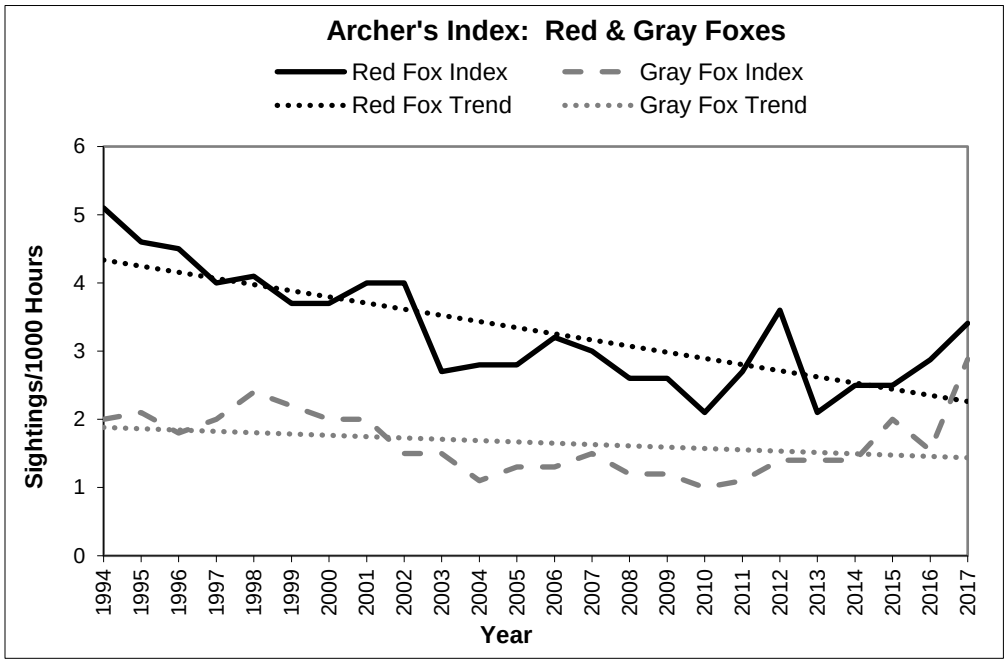

Figure 53. Red fox and gray fox population trends in Missouri based on the Archer's Index, derived from the MDC Bowhunter Observation Survey.

Table 8. Missouri hunter hours and furbearer population indices based on archer's diaries, 1983 to 2017.

YEAR	Hunter Hours	Coyote	Red Fox	Gray Fox	Bobcat	Raccoon	Virginia Opossum	Striped Skunk	Mink	Beaver	Muskrat	Weasel	Badger	River Otter	Black Bear
1983	55,374	20.0	6.5	5.1	1.7	23.8	12.6	5.0	0.7	0.3	0.5	0.1	0.1	0.0	0.0
1984	32,746	18.8	6.8	3.1	1.2	16.9	6.4	3.5	0.3	0.3	0.1	0.0	0.1	0.0	0.0
1985	30,990	20.1	5.3	2.8	1.5	15.4	8.6	4.2	0.5	0.4	0.4	0.1	0.1	0.1	0.0
1986	51,727	23.5	5.7	2.8	1.5	15.3	6.9	3.5	0.3	0.4	0.0	0.0	0.0	0.0	0.0
1987	57,457	23.5	4.5	2.5	2.0	23.3	10.1	3.0	0.3	0.7	0.2	0.1	0.1	0.1	0.0
1988	84,497	22.4	4.7	2.4	1.7	16.7	4.8	2.7	0.3	0.6	0.1	0.0	0.1	0.1	0.0
1989	72,992	21.1	5.1	2.4	1.8	19.6	5.6	3.5	0.1	0.6	0.1	0.0	0.2	0.1	0.0
1990	72,227	23.6	4.9	2.3	2.9	24.0	7.2	3.5	0.2	0.4	0.1	0.0	0.1	0.1	0.0
1991	64,434	26.1	4.7	3.0	3.3	30.5	11.7	4.0	0.3	0.3	0.1	0.0	0.1	0.0	0.1
1992	64,452	22.5	4.7	2.3	2.9	24.3	8.9	2.8	0.6	0.7	0.1	0.0	0.1	0.3	0.0
1993	53,857	19.7	4.2	2.1	3.2	28.1	7.7	3.7	0.2	0.5	0.2	0.0	0.1	0.3	0.0
1994	49,102	21.0	5.1	2.0	3.4	32.0	7.6	3.2	0.1	0.5	0.2	0.0	0.2	0.2	0.0
1995	66,106	22.3	4.6	2.1	3.8	36.5	9.6	3.6	0.1	0.3	0.1	0.0	0.1	0.3	0.1
1996	60,077	19.6	4.5	1.8	4.1	29.7	6.6	2.7	0.0	0.3	0.0	0.0	0.1	0.5	0.0
1997	47,816	18.0	4.0	2.0	4.5	31.2	7.4	2.7	0.1	0.4	0.0	0.0	0.1	0.6	0.0
1998	43,152	20.8	4.1	2.4	4.4	33.0	10.6	4.2	0.1	0.3	0.1	0.0	0.2	0.3	0.1
1999	44,012	29.2	3.7	2.2	4.8	45.9	12.5	4.0	0.2	0.3	0.1	-	0.1	0.5	-
2000	50,795	20.0	3.7	2.0	4.9	32.1	8.1	3.3	0.0	0.2	0.0	0.0	0.1	0.3	0.0
2001	47,023	19.5	3.6	2.1	5.2	38.7	8.2	4.7	0.1	0.4	0.0	0.0	0.1	0.3	0.0
2002	42,826	24.6	3.8	1.5	7.9	42.6	14.4	5.6	0.3	0.1	0.0	0.0	0.1	0.8	0.1
2003	39,964	20.5	2.7	1.5	6.0	37.9	7.2	3.2	0.1	0.1	0.0	0.0	0.2	0.6	0.0
2004	35,071	17.6	2.8	1.1	4.7	37.3	7.9	2.6	0.1	0.1	0.1	0.0	0.1	1.2	0.0
2005	68,440	21.2	2.8	1.3	5.6	37.3	8.5	2.5	0.1	0.3	0.0	0.0	0.1	0.5	0.0
2006	60,040	22.2	3.2	1.3	6.9	54.4	14.4	3.8	0.3	0.2	0.0	0.0	0.1	0.5	0.0
2007	50,390	19.8	3.0	1.5	5.2	40.0	9.4	4.0	0.0	0.1	0.0	0.0	0.1	0.4	0.0
2008	44,471	16.3	2.6	1.2	5.0	41.5	7.8	3.7	0.1	0.1	0.1	0.0	0.4	0.3	0.0
2009	44,919	20.6	2.6	1.2	4.9	42.0	12.4	4.4	0.1	0.1	0.1	0.0	0.2	1.2	0.1
2010	42,907	27.1	2.1	1.0	5.9	60.6	12.9	3.1	0.2	0.1	0.0	0.0	0.2	0.7	0.0
2011	41,370	26.1	2.7	1.1	6.6	70.1	16.6	4.6	0.2	0.1	0.1	0.0	0.2	0.9	0.0
2012	63,621	24.4	3.6	1.4	5.3	45.8	7.1	5.6	0.1	0.1	0.0	0.0	0.3	1.1	0.0
2013	68,674	16.2	2.1	1.4	4.0	33.3	5.7	2.9	0.1	0.2	0.1	0.0	0.1	0.6	0.1

YEAR	Hunter Hours	Coyote	Red Fox	Gray Fox	Bobcat	Raccoon	Virginia Opossum	Striped Skunk	Mink	Beaver	Muskrat	Weasel	Badger	River Otter	Black Bear
2014	60,560	20.3	2.5	1.3	3.4	37.5	5.8	2.8	0.0	0.1	0.0	0.0	0.3	0.3	0.1
2015	58,203	26.2	2.5	2.0	5.0	55.2	13.4	3.8	0.0	0.0	0.1	0.0	0.3	0.6	0.1
2016	41,409	23.3	2.9	1.5	4.5	36.6	10.2	4.4	0.0	0.3	0.1	-	0.2	0.2	0.2
2017	98,898	24.3	3.4	2.9	5.0	48.5	11.8	2.5	0.1	0.1	0.0	-	0.2	0.6	0.1

Table 9. Missouri furbearer species population indices (sightings/1,000 hours) by county derived from the MDC Bowhunter Observation Survey in 2017.

County	Coyote	Raccoon	Virginia Opossum	Red Fox	Gray Fox	Bobcat	Badger	Black Bear
Adair	18	34	4	2	.	1	.	.
Andrew	29	74	21	.	.	5	.	.
Atchison	89	119	30	.	.	6	.	.
Audrain	40	95	4	2	11	7	.	.
Barry	12	41	6	3	9	10	.	.
Barton	66	47	6	.	.	.	.	.
Bates	15	38	6	.	.	7	.	.
Benton	23	33	6	.	.	7	1	.
Bollinger	14	34	6	2	1	3	.	.
Boone	24	26	14	2	2	2	.	.
Buchanan	61	128	6	3	.	9	.	.
Butler	19	32	3	.	2	15	2	5
Caldwell	45	48	3	.	.	3	.	.
Callaway	10	35	16	2	2	.	.	.
Camden	13	13	15	1	1	1	.	.

County	Coyote	Raccoon	Virginia Opossum	Red Fox	Gray Fox	Bobcat	Badger	Black Bear
Cape Girardeau	17	60	7	1	1	3	.	.
Carroll	23	121	8	.	.	3	.	.
Carter	4	11	2	4	.	4	.	.
Cass	25	29	15	.	.	8	.	.
Cedar	36	64	38	2	.	17	.	.
Chariton	42	130	11	.	10	5	.	.
Christian	36	16	7	.	2	.	.	.
Clark	17	51	2	2	.	5	.	.
Clay	50	95	28	2	.	.	.	.
Clinton	22	74	.	3	.	8	.	.
Cole	22	13	3	1	1	4	.	.
Cooper	31	82	17	2	.	9	2	.
Crawford	6	35	6	.	10	14	.	.
Dade	24	45	8	.	.	11	.	.
Dallas	10	30	2	.	.	2	.	.
Daviess	28	118	20	6	1	4	.	.
Dekalb	27	70	23	.	.	2	.	.
Dent	13	38	1	.	3	3	.	.
Douglas	14	20	8	.	8	6	.	8
Dunklin	58	65	29	7	.	36	.	.
Franklin	21	35	7	0	.	3	.	.

County	Coyote	Raccoon	Virginia Opossum	Red Fox	Gray Fox	Bobcat	Badger	Black Bear
Gasconade	26	35	9	1	1	6	1	.
Gentry	26	86	20	2	.	.	.	.
Greene	15	42	10	4	2	.	.	.
Grundy	4	113	4	.	.	17	.	.
Harrison	31	64	8	.	.	.	.	.
Henry	28	85	19	17	13	4	1	.
Hickory	11	24	16	.	3	4	.	.
Holt	46	31	.	.	.	.	.	.
Howard	40	114	18	2	6	5	.	.
Howell	17	7	9	3	3	5	3	.
Iron	46	46	25	.	4	15	.	.
Jackson	27	97	41	5	.	9	1	.
Jasper	18	46	15	1	.	11	.	.
Jefferson	11	27	4	4	1	3	.	.
Johnson	18	63	36	1	2	3	1	.
Knox	59	129	17	4	2	2	.	.
Laclede	24	76	33	1	1	8	.	3
Lafayette	33	127	24	2	.	10	.	.
Lawrence	30	57	9	.	.	4	.	.
Lewis	36	49	5	.	.	9	.	.
Lincoln	22	37	9	1	1	2	.	.

County	Coyote	Raccoon	Virginia Opossum	Red Fox	Gray Fox	Bobcat	Badger	Black Bear
Linn	36	11	6	2	.	2	5	.
Livingston	11	49	2	2	.	2	.	.
McDonald	46	9	25	2	.	9	.	.
Macon	15	85	11	1	1	3	.	.
Madison	12	11	3	3	.	4	.	.
Maries	76	52	12	6	4	.	.	.
Marion	29	47	13	1	1	6	.	.
Mercer	14	29	.	1	.	1	1	.
Miller	16	38	13	.	.	18	.	.
Mississippi	.	.	.	.	.	.	.	.
Moniteau	.	40	40	.	8	.	.	.
Monroe	20	49	16	4	1	4	.	.
Montgomery	41	40	13	1	2	5	1	.
Morgan	19	11	7	9	4	4	.	.
New Madrid	38	96	.	.	.	.	.	.
Newton	24	28	6	2	.	3	.	.
Nodaway	72	184	43	9	.	9	.	.
Oregon	18	4	13	1	.	3	.	.
Osage	15	33	9	3	5	4	.	.
Ozark	12	9	5	.	1	6	.	.
Pemiscot	.	.	37	.	.	.	.	.

County	Coyote	Raccoon	Virginia Opossum	Red Fox	Gray Fox	Bobcat	Badger	Black Bear
Perry	14	49	13	2	4	13	2	.
Pettis	43	76	25	1	.	8	.	.
Phelps	16	22	15	1	3	.	.	.
Pike	20	43	10	12	31	4	.	.
Platte	42	28	15	3	.	5	.	.
Polk	42	72	14	1	1	5	.	.
Pulaski	32	52	7	1	.	6	.	.
Putnam	20	62	7	.	.	2	.	.
Ralls	23	53	11	2	.	9	.	.
Randolph	12	65	3	7	.	3	.	.
Ray	17	58	11	.	.	6	.	.
Reynolds	14	5	11	2	.	11	.	.
Ripley	37	29	6	106	10	11	.	.
St. Charles	29	38	6	4	2	2	.	.
St. Clair	23	17	6	.	.	2	.	.
St. Francois	8	33	16	9	2	5	.	.
Ste. Genevieve	29	23	4	10	25	12	.	.
St. Louis	20	29	4	5	2	1	1	.
Saline	38	73	24	3	2	4	1	.
Schuyler	25	40	9	.	.	6	.	.
Scotland	9	61	9	2	.	4	.	.

County	Coyote	Raccoon	Virginia Opossum	Red Fox	Gray Fox	Bobcat	Badger	Black Bear
Scott	63	.	.	.	.	21	.	.
Shannon	12	8	.	.	.	6	.	10
Shelby	14	110	15	1	.	3	.	.
Stoddard	11	44	9	9	.	2	.	.
Stone	79	205	6	12	.	10	.	.
Sullivan	55	49	6	.	.	4	.	.
Taney	8	6	6	.	8	2	.	.
Texas	14	13	7	.	.	10	.	.
Vernon	20	52	33	2	.	4	.	.
Warren	16	17	6	.	.	1	.	.
Washington	21	38	9	4	8	8	.	.
Wayne	7	9	1	3	1	6	.	.
Webster	32	47	9	.	2	8	.	.
Worth	74	101	64	6	.	12	.	.
Wright	86	30	10	2	.	12	.	.
Statewide Index	**24.3**	**48.5**	**11.8**	**3.4**	**2.9**	**5.0**	**0.2**	**0.1**

MONITORING AND DEMOGRAPHIC ASSESSMENT OF RIVER OTTERS AND BOBCATS IN MISSOURI

River otter and bobcat are commonly sought-after furbearers in Missouri and there are no harvest level restrictions on river otters or bobcats. Various population indices suggest these species are not in danger of being over harvested; however, harvest of these species has been challenged in a number of states. MDC began a research project to document the sex and age of harvested animals and measure harvest effort by trappers for these species. These and other data will enable MDC to utilize Statistical Population Reconstruction (SPR) to generate abundance estimates and measure the impact of harvest and regulations on river otter and bobcat populations. Through SPR, the MDC will have a better understanding of the relationship between harvest rates and demographics of each species. Population reconstruction will also provide the MDC with solid harvest and population data.

In order to utilize SPR, MDC collects information on harvested river otter and bobcat through mandatory registration and voluntary tooth submission. Trappers are asked to remove one of the lower canine teeth from each river otter and bobcat they harvest so that age-at-harvest can be determined. Sex, date of harvest, method, and effort (trapped animals) are collected when river otter or bobcat are tagged or registered with the Department.

During the 2016-17 river otter and bobcat harvest seasons, 347 lower canine teeth were collected from both river otters and bobcats with 11 samples excluded from analysis because they were cut too short or the wrong tooth was sent in for aging. The samples sent for aging consisted of 243 river otter (Figure 54) and 93 bobcat teeth (Figure 55). Age data for the 2017-18 season are not yet complete.

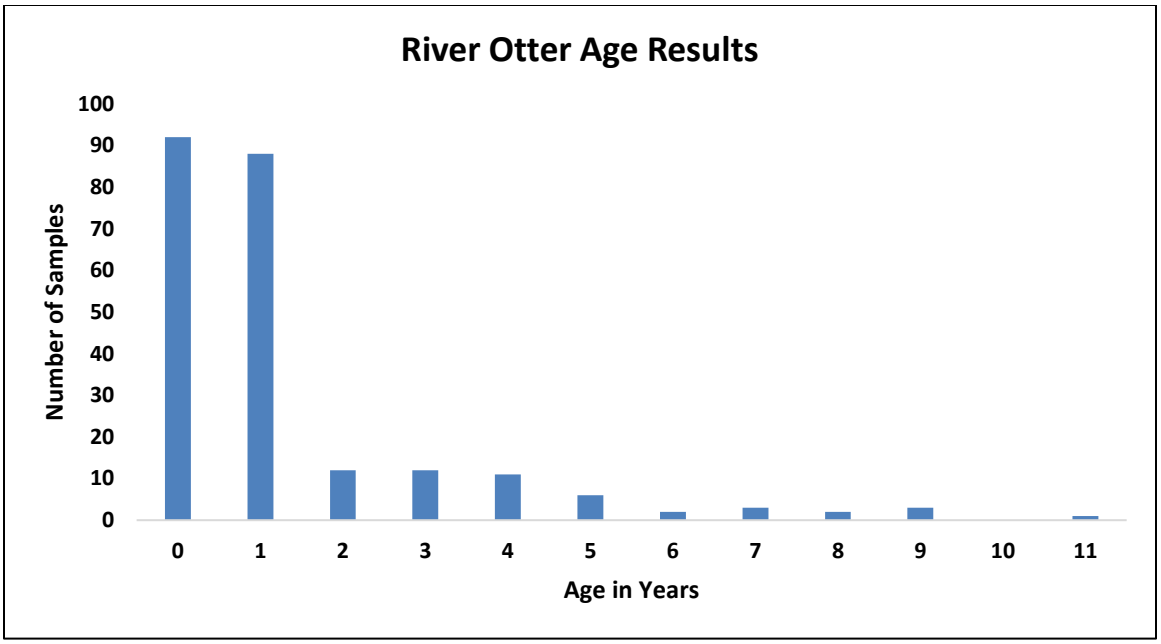

Figure 54. Complete age results from the Missouri 2016-17 river otter harvest season.

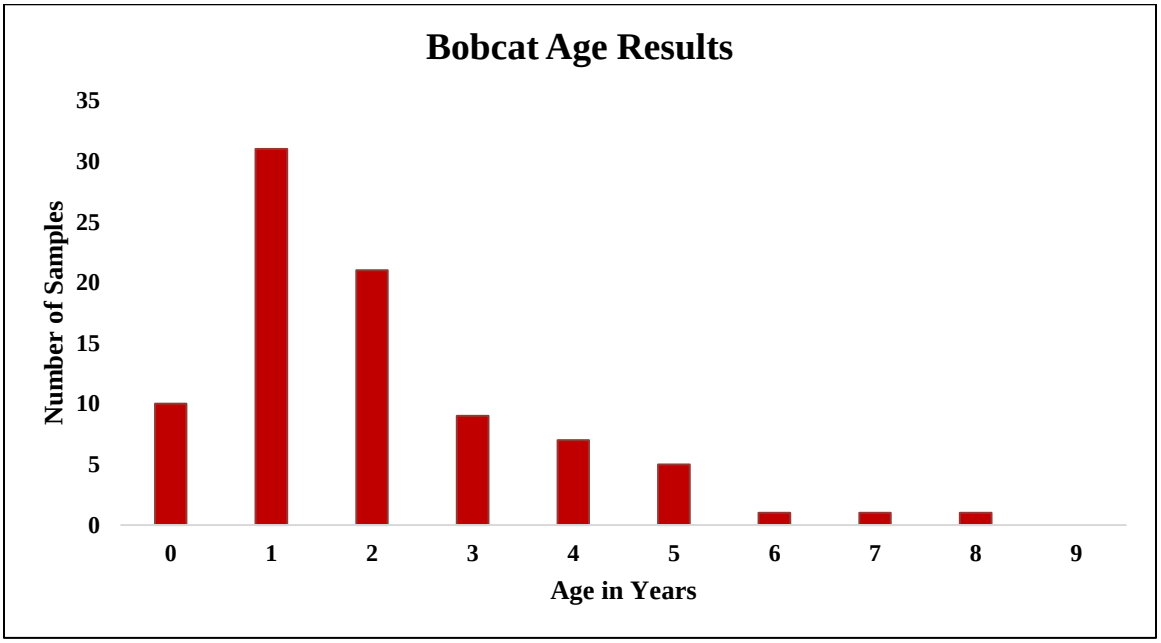

Figure 55. Complete age results from the Missouri 2016-17 bobcat harvest season.

BLACK BEAR DISTRIBUTION AND STATUS

Black bear goal/vision statement:
The current goal of black bear management in Missouri is to encourage black bear population expansion within their natural range in Missouri, and to manage black bears consistent with the available habitat and within the limits of human tolerance.

Black bear program objectives:

- Increase knowledge about current black bear population status in Missouri.
- Increase knowledge of black bear ecology in Missouri, how they move, disperse and travel on a landscape level and identify source and sink populations.
- Develop black bear conservation and management strategies based on information gathered through research, monitoring, and surveys.
- Educate Missouri's public, the media, and other resource professionals in Missouri and the Midwest about black bears and Missouri's black bear management program.

The Black Bear Management Plan was drafted and approved in 2008 by a multi-agency group of resource professionals from the Missouri Department of Conservation, U.S. Forest Service, National Park Service, and Missouri Department of Natural Resources. The entire black bear management plan can be viewed at:

https://nature.mdc.mo.gov/sites/default/files/downloads/black_bear_plan_2008_01-31-11.pdf

Initial population research suggested a 2012 statewide estimated population of just under 300 bears. In order to model statewide bear numbers and estimate population trajectory, MDC began a project to measure **reproductive and survival rates** of female bears in Missouri. This black bear population model will be used to predict growth and trajectory of Missouri's black bear population. Current plans are to propose a limited harvest once bear numbers exceed 500 animals. Other research objectives include measuring black bear habitat use and movement patterns, identifying suitable but unoccupied habitat and to delineate travel corridors that link large tracts of suitable bear habitat in the state.
Since the initiation of the Missouri black bear research project in 2010 through June 30, 2018, MDC has marked at least **166 black bears** and has deployed collars on over 100 bears. As of June 30th, MDC was monitoring 32 female bears. Female bears will be monitored in the winter den to assess cub production, cub sex ratios and cub survival, in addition to survival, habitat use, and movements. Males will be monitored to assess survival, habitat use, movements, and breeding range.

Winter den checks allow MDC to assess the condition of the sow, adjust or change her radio collar if necessary, determine how many cubs or yearlings are with her in the den, and mark any young that can be handled. During the winter of 2018, 24 adult female bears and 2 adult males were monitored during the winter den season. Nearly all dens were located via radio telemetry and were visited between January and March depending on the sow's reproductive status and age. Nine sows were handled in the den, of which 7 had newborn cubs. MDC was unable to handle 14 female bears due to the den type or the bear remained active but was able to collect reproductive data on many of those females through observations of yearlings and cubs at several of these dens. MDC did not work any males in the den.

Spring and summer trapping is utilized to capture new bears for the study and to recapture bears that had previously lost their collars or were not handled in the den. Bears are captured in barrel, culvert, or box-style trailer traps. Traps and bait sites are monitored by regional staff from multiple Divisions within the Department. Marked bears that do not need to be handled are released without workup. From 22 May 2018 – 27 June 2018 MDC spent 168 trap nights with traps run in Shannon, Oregon, Howell, Ozark, Douglas, Webster, Wright, Christian, and Taney Counties and had 59 capture events. Of these 59 capture events, 27 bears were immobilized, including 14 bears that had previously never been handled. Three new females were collared and several bears that had previously dropped their collars were added back to the study. Collared bears are currently distributed through the majority of bear range.

DETERMINING ORIGIN, SEX, GENOTYPE, AND MOVEMENTS OF MOUNTAIN LIONS IN MISSOURI

There is mounting evidence that mountain lion populations are in the process of reclaiming former habitats in the Midwest. Given the numerous mountain lion confirmations in Missouri, especially the southeastern Ozarks, there seems to be an attraction to this area and it is possible that some mountain lions may establish home ranges. In order to continue to learn about and monitor these animals, the Department has initiated a small research project that will use opportunistic detections or captures of mountain lions to better assess the biology and ecology of mountain lions in Missouri.

MDC has enlisted the aid of a scat detection dog trained to find only mountain lion scat. Collection of mountain lion scats around confirmed reports will allow us to collect genetic material from these mountain lions. Collected scats are preserved and shipped to the USDA Wildlife Ecology Research Unit of the Rocky Mountain Research Station. Collected DNA is amplified and species, sex, and individual genotype are identified. To infer the likely population of origin of these mountain lions, genotypes will be compared with those in the laboratory's database. Mountain lion genetic samples collected in Missouri will be compared to those previously detected in the state and with those from surrounding states to quantify a minimum number of individual mountain lions. Collecting genetic material is not without its challenges. The time that has lapsed between a confirmed report and the mountain lion's presence, as well as the weather during that time period will affect the ability to detect scats. Given the infrequent nature of mountain lion confirmations in the state (only 6-10 confirmations per year), the scat detection dog is used minimally each year. The Department may also opportunistically capture and radio-mark mountain lions with satellite equipped transmitters. Radio-marked animals will allow MDC to examine movement patterns and, over time habitat use, prey selection, and home range size or dispersal movements.

In addition to the use of a scat dog, the Department opportunistically collects DNA from Large Carnivore Response Team investigations. Additional details about genetic results from opportunistically collected samples can be found on Page 38, under the Large Carnivore Response Team updates.